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The gift of

Miss Emma F. I. Dunston

THE FIELD, THE GARD

AND

THE WOODLAND;

OR,

INTERESTING FACTS

RESPECTING

FLOWERS AND PLANTS IN GENERAL.

DESIGNED FOR THE YOUNG.

BY ANNE PRATT,

AUTHOR OF "FLOWERS AND THEIR ASSOCIATIONS," &c.

> "Something to please and something to instruct,
> E'en from the meanest weed."

THIRD EDITION.

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TO

HER NEPHEW,

THIS LITTLE WORK IS AFFECTIONATELY INSCRIBED

BY

HIS FRIEND AND RELATIVE,

THE AUTHOR.

PREFACE.

THE design of the following work is to present to the young reader several interesting facts, with which the Botanist becomes acquainted in the pursuit of science. By stating them in a familiar form to the unlearned, the author hopes to awaken some interest in the study and observation of nature—a study alike elevating and consoling in its influences on the mind.

It has been her object, throughout the work, to direct the attention to the wisdom and goodness of God, as exhibited in the structure and arrangement of the vegetable kingdom; and to demonstrate the confirmation which is added by Nature to the doctrine declared by Revelation, of a superintending Providence.

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THE FIELD, THE GARDEN, AND THE WOODLAND.

Letter I.

Introductory Remarks—Scarlet Pimpernel—Regular unfolding of Flowers—Linnæus—Dial of Flowers—Evening Primrose—Sensibility to Rain in the Rose of Jericho—Wild Convolvulus—Tuberose—Daisy—Remarks on a Superintending Providence.

My dear John,

The following letters are not written with a design of teaching you Botany, but with a view of directing your attention to several interesting facts respecting plants, in order that you may at some future time be induced to pursue a study which will open to you a source of deep and continual interest, and strengthen that love of flowers and plants which is natural to you. I say that it is natural to you, because I believe that all children, even those at a very early age, are fond of flowers. To ramble about among the meadows, gathering those early favourites the buttercup and daisy, or to search the hedge-bank for the blue violet, fills their hearts with delight; and few children as they grow older (especially those who reside in the country, or visit it occasionally) are indifferent respecting the names, properties, and uses of plants. As the love of flowers forms a pleasure not only innocent but improving—since all the works of God are very beautiful and deserving careful attention—I shall tell you a few things respecting the flowers that you will find in the fields ar hedges, as well as some facts relative to plants of foreign countries, which you will be able to understand without previous study; and with which my own observation of nature, and my acquaintance with the works of others, may have rendered me familiar.

Although I have selected this portion of nature for my remarks, I trust that your attention will not be confined to plants. Not only every flower that blows, but every bird and insect that wings the air, or creeps on the earth, contains within itself a beauty and mechanism, unseen by the careless, which bespeak alike the wisdom and goodness of God. The pursuits of nature will be beneficial to your health, by inducing you to seek the open air; and useful to your character, by leading you to feel interested in facts, and to observe them with accuracy. They may influence your happiness by giving you a large and additional means of enjoyment. "Happy are they," says the refined and elegant Gray, "who can create a rose-tree, or erect a honeysuckle: who can watch the brood of a hen, or a fleet of their own ducklings as they sail upon the water!"

One great value of this kind of happiness is, that it is, more than almost any other, independent of circumstances. You derive pleasure from social intercourse; but your friends may be removed from you by death, or separated by distance, and some of them may even be changed in feeling towards you. Your riches may take to themselves wings and fly away, and be no longer your own; but the green meadows will still be yours, and the blue skies will still be spread over them, and you may wander among the fields, and as you examine their various beauties, remember that He who formed and daily preserves them is taking care of you. I wish you to cultivate a cheerful and grateful feeling—a feeling which cannot belong to the indolent, but which attends the reflection of an hour well improved. With the book of nature spread open before you, and the book of God for a commentary upon it, surely you ought never to feel sad or lonely.

One of the prettiest little flowers that adorns the sides of lanes, but spreads itself more especially among the corn-fields, is the scarlet pimpernel (*Anagállis arvénsis*). This small flower, and the common red poppy (*Papáver rhæas*), are the only instances of bright scarlet blossoms among our British plants. This brilliant colour seems to require the warm sun of the Tropics, since in those countries where great heat prevails flowers of the most brilliant scarlet hang in large clusters upon the trees, or adorn the earth; while birds with red plumage hop from tree to tree, and give a lustre to the landscape unknown in England.

The pimpernel flowers in June and July very generally in all parts of England. Its leaves are of an oval shape, and are spotted on the under-surfaces; it opens in warm sunny mornings at about eight o'clock, and shuts up its blossoms towards noon: so that should you seek it in your early morning walk, you will find only the bright red bud, peeping out from its green cup, and when it unfolds its purple eye to the sun, it may serve to remind you that it is the time for returning to your breakfast.

By carefully watching the flowers, you will soon perceive an order in nature which proves that they are directed by an intelligent Being; as many flowers have their regular times of expanding and closing every day. Linnæus, the celebrated naturalist, who devoted a considerable portion of his life to the study and arrangement of plants, had so accurately marked their various times of opening, that he made a dial of flowers, by planting them in such a manner as that at each succeeding hour a blossom should unfold; and thus, from morning to evening, the time was indicated by this delicate monitor. Linnæus, indeed, seldom needed a watch or clock. To his eye the different aspects of nature were so familiar, that one glance upon a meadow or a hedge-bank was usually sufficient for his direction. How many will walk or ride for hours in the country without adding one idea to those already acquired, and to whom the opening or closing of a flower-bud will seem a matter of mere accident quite unworthy attention!

"The primrose on the river's brim,
A yellow primrose is to him;
But it is nothing more."

It was not without long and frequent study that this great naturalist became acquainted with the peculiarities of flowers; and you must ever remember that unless a habit be acquired of attentively observing the various objects by which we are surrounded, much that is useful and interesting will escape our notice, and be spread before us in vain.

Poets call the flower which I have mentioned "the cheerful pimpernel;" either because Pliny, an ancient naturalist, said that, when taken internally, it promoted mirth; or because when this flower is wide open the sun is usually shining gaily in the sky. Upon approach of rain it folds itself quite up, and from its thus foretelling to the labourer the coming shower, it is called the "poor man's weather-glass." You may often find it as a weed in the garden, and it may generally be relied on as a good indication of the state of the atmosphere; except at a time when there has been a long succession of rains, when it loses its sensibility, and remains open through all weathers. This flower is highly extolled in ancient herbals as one of great medicinal virtues, but it is not now used in medicine. There is a blue variety of pimpernel, but it is more rare, as it is confined to different spots, and in some counties it is scarcely to be met with at all; although, in districts where it flourishes, it is almost as common as the scarlet flower. A pimpernel of a clear white, with a beautiful purple centre, has been also found in Wales.

The evening primrose (*Œnothéra biénnis*), so well known in our gardens, and often found growing wild in places where they have formerly been, opens its yellow fragrant flowers in the evening; and the Marvel of Peru (*Mirábilis horténsis*), which the French call *Belle de Nuit* (Beauty of the Night), expands when the other flowers are sleeping, and, soon as morning fully dawns upon it, folds its blossoms in spiral buds.

The shrub called the Rose of Jericho, whose native land is Arabia Petrea, presents a very remarkable instance of sensibility in rainy weather. Its beautiful blossoms, which, while in bud, are of a deep red, and, when fully blown, of a clear white colour, grow upon stems which are not upright, but which spread from their centre over a considerable space of ground. The flowers and leaves fall off together at the end of the season, leaving the stems bare. These stems all approach together, and close in a globular form, during damp weather, and spread open in the sunshine. The unenlightened people who live in its native country, instead of accounting for this

Rose of Jericho.

closing and expanding upon natural principles, suppose that every year a miracle is effected for their information of futurity. When they purpose to marry, to make a journey, or to perform any undertaking of importance, they will go some distance to examine these shrubs. If the stems are drawn up closely together, they regard it as an unfavourable token, and if possible relinquish their project; but if they are spread open, they consider it as an intimation that their undertaking will be successful.

It may seem to you very remarkable, that the people of Arabia should for many years have thus watched this plant, without having discovered that it is thus affected by the atmosphere. But they observe it with minds prejudiced against the truth. Taught from childhood to regard it as a guide for their direction, they would not easily be persuaded to investigate the circumstance, or to ascribe its effects to natural influences. "What we learn in youth," says a Hindoo proverb, "is like a writing cut in stone."

There are several other flowers in our meadows besides the pimpernel, whose blossoms shrink at the approach of rain; among which is the field convolvulus (*Convólvulus arvénsis*), sometimes called bind-weed. You may have seen many a little girl twine a wreath of this elegant flower around her bonnet, and neither nature nor art could furnish her with one that is prettier. Its sweet-scented blossoms, whose smell resembles that of the almond, are striped with white and rose-colour; and with its leaves of a delicate green, trail along the banks of the meadow, or around the trunks of trees, and sometimes support themselves by clinging to the corn. They may be seen during the summer and autumnal months in almost every spot where the grass is growing or the wild flower budding. If it were not that we see it so often, the convolvulus would win our admiration by its sweetness and beauty; yet we should not think, because anything is common, that it is unworthy our notice. The bright stars that shine in the heavens are not the less wondrous and magnificent because they shine nightly; and many of the most beautiful and interesting objects of nature meet our eye frequently.

I shall here direct your attention to a very remarkable phenomenon exhibited by some flowers during night. The common Monkshood (*Aconítum Napéllus*) is said by St. Pierre to emit in the dark a bright phosphorescent light. The same singular light was observed by a daughter of Linnæus to proceed from the garden nasturtium (*Tropoelum május*). A writer in the Edinburgh Philosophical Journal says of the Tuberose (*Poliánthes Tuberósa*), whose white blossoms are called, by the Malays, "Mistress of the Night,"—"This plant emits its fragrant smell powerfully after sunset; and has been observed, in a sultry evening after thunder, when the air was highly charged with electric fluid, to dart small sparks or scintillations of lurid flame in great abundance from such of its flowers as were fading."

Some species of moss are thus illumined during darkness, and it is most probable that by frequent observation this phenomenon might be seen in some other flowers. This probability should induce you to make your own observations, since they may not only tend to establish facts mentioned by others, but may enable you to make discoveries of some hitherto unsuspected. It is not only by great learning that we may promote the interests of science: the most simple observer of nature is here capable of adding his mite to the general treasure.

I shall close my letter with some account of a flower which is too common to need any description. The Daisy (*Béllis Perénnis*), one of the earliest of our spring flowers,—even venturing forth sometimes during winter, —derives one of its great attractions from its commonness; since there is no part of our country where it may not be seen, peeping like a gem from among the green grass long before the other flowers appear. It is so hardy that the frosts of February and the bleak winds of March do not harm it; and it seems to speak a promise, when we first see it, that other meadow friends will in their season gladden our sight; and to persuade us that t period is very near when we shall say, "the winter is past, the rain is over and gone, the flowers appear on the earth, the time for the singing of birds is come, and the voice of the turtle-dove is heard in our land." Every creature seems to rejoice at the approach of spring: and surely no human being, if we except him whose sensibility has been impaired by dissipation, or by the undue desire of riches, or other engrossing passions, can be altogether indifferent to vernal beauties and vernal melodies.

The fair white rays of the spring's first flower, sometimes tipped with a beautiful crimson, unfolding with the morning and closing up at sunset, procured for it the pretty name of Day's Eye (Eye of Day): its Latin name *Bellis* signifies beautiful; and the French call it *Marguérite*, from Margarita, a pearl. It is always a favourite flower with the lover of nature. The poet Wordsworth, who has addressed many stanzas to it, truly calls it the "flower whose home is everywhere," and elsewhere alludes to it as one of the pearls of spring: while Burns and James Montgomery are among many others who have celebrated its modest beauties in poetry. The daisy was formerly regarded as the emblem of affection, and Chaucer and others of our earlier poets make frequent allusions to it as such.

A playful superstition is practised with the daisy by the country children in many parts of France. To test the sincerity of their companions' friendship, they pull off, one by one, the white rays of the flowers, saying alternately, 'Does he love me?—does he not?' until they have stripped off all the rays of the daisy. If the question 'Does he love me?' occurs at the last ray, the conclusion is favourable to the little inquirer.

If the yellow centre or disk of the daisy, as well as the surrounding rays, be examined, they will be found to contain several florets or small flowers, each one distinct from the others; and this circumstance constitutes the character of what is called a compound flower, of which there are a great number among our wild plants.

The parts of many flowers are so small that they cannot be clearly seen without the aid of a microscope; and, indeed, in the study of nature generally you will derive great assistance from a pocket-glass, such as is commonly used by naturalists. It is composed of two or more magnifying glasses, enclosed in a case, and may be purchased at the expense of a few shillings. I feel persuaded that, if once used, you will derive from it so much additional pleasure, as that you will not readily dispense with it in future.

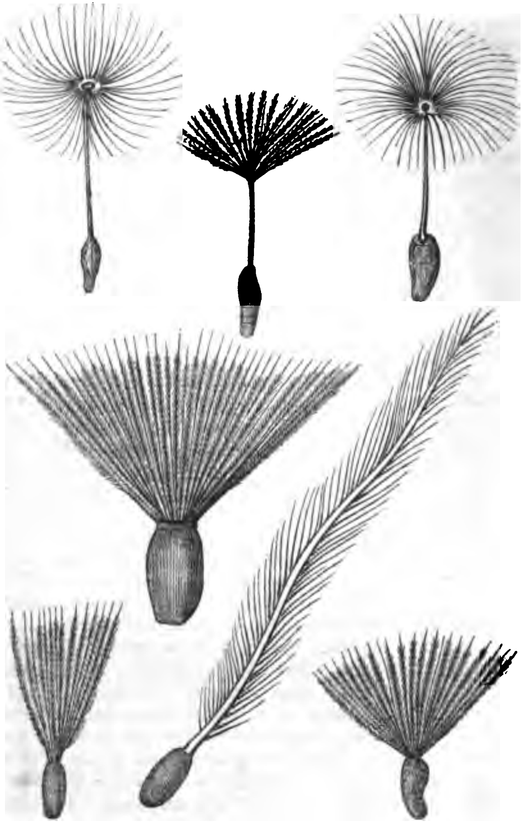
Nor should we fail here to remark how plainly the wisdom of God is shown to be perfect by the minute parts of his creation. We may observe in man, that the mind capable of accomplishing any great work is often incapable of executing lesser objects; but it is not so with God. He who framed the lofty mountain or the huge elephant, has also fashioned the florets of the daisy, and decked with feathers the wing of the moth. This consideration, while it interests our understanding, should also encourage our hearts; for the truth that there is a God superintending the affairs of every individual, should cheer us under circumstances that would otherwise be depressing. Those who do not believe the Scriptures might tell you that it is presumptuous to suppose that the great Creator of the universe will occupy himself with the trivial concerns of an individual. If, indeed, the great God were a being like ourselves, incapable of attending to many things at the same moment, this argument might have some force: but He who has said that not even a sparrow falleth to the ground without his permission, has plainly confirmed his word by his works. If in his care over the flowers he has so constituted them as that they shall fold themselves up when the coming storm would injure their delicate forms; if he has framed the little daisy with beauties so minute and yet so perfect,—will he regard an intelligent thinking being as beneath his care?

This reflection supported the heart of the lamented traveller in Africa, Mungo Park, when it was almost sinking within him: faint and wearied, he sat him down to rest on a spot far from the sound of a human voice, and beyond the sight of a human habitation. A feeling of utter friendlessness had begun to weigh down his spirit, when his eye happened to rest upon a small flower of singular beauty that was growing beside him. The evident care manifested for the little wild blossom re-animated him: and consoled by the assurance that He who thus clothed with loveliness and shielded from harm a flower of the desert, would not forget the wants and sorrows of any of His human family, he rose and cheerfully pursued his way.

LETTER II.

Dispersion of Seeds—Dandelion—Uses—Traveller's Joy—Common Burdock—Explanation of terms Corolla and Calyx—Common Avens—Furze—Beans and Peas—Nuts—Seed-vessel of the Violet—Touch-me-not—Genipa Tree—Pot Tree—Molucca Beans—Guernsey Lily—Trees on high rocks—Beauties of Meadow.

I SHALL in this letter give you an account of the many different ways in which the seeds of plants are dispersed. You have perhaps often passed by the dandelion (*Leóntodon Taráxacum*), as a plant possessing little attraction; yet it affords a wonderful and beautiful instance of an appropriate provision for reproducing a flower, valuable especially to the bird and the bee. The round feathery head which this plant presents after the yellow flower has withered and fallen off, is composed of seeds, to each of which is attached a kind of feather. These light and beautiful seeds may often be seen floating upon the air, and children, when they amuse themselves by endeavouring to blow them off by one breath, assist unconsciously in sending them to a distance; while the wind and rain separate the seed from its feather, and the latter moistens the earth and renders it fit for the reception of the seed. This is one of the wise and kind plans of God that meet us at every step when we are investigating nature. The seed is intended to bring up the dandelion of the next year; and as the plants of the field are not under the care of man, as are those of the hothouse or garden, they are furnished with the means of planting themselves. Were it not for this provision, the plants would grow only during one year, and the little birds who depend upon the seeds for food



Magnified examples of the downy appendages of Seeds.

would be starved; while the industrious bees would, during the early months of spring, greatly miss a flower of which they seem very fond.

This plant is also useful for man. The leaves, which grow only near the root, are much used for salad, especially by our Continental neighbours. Their deep and singularly notched edges have been fancifully thought to resemble the teeth of a lion, and they are by botanists, on that account, termed lion-toothed. The root is frequently administered by the medical practitioner in complaints of the liver.

Almost every vegetable production is of some use. Plants afford us food, wine, sugar, oil, medicine, and healing applications; and they are useful in dyeing, bleaching, and various manufactures. But there are some whose uses are not yet discovered; and it is probable that some are designed entirely as ornaments to our gardens and meadows. All, however, possess some beauty, and are evidences of the goodness of that Being who formed them to give pleasure to the eye. Who that has walked into the woods and fields on a fine summer morning, and heard the birds singing, and seen the trees waving above him, and the wild flowers springing beneath his feet, has not felt as he looked around him, or paused to listen, that God has made beautiful sights for his eye, and melodious sounds for his ear, in order that he may observe and enjoy them?

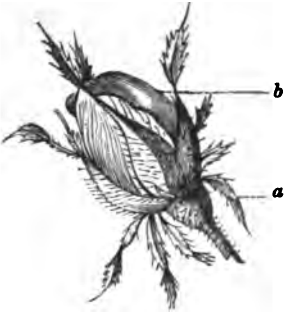
This arrangement of feathered seeds belongs to many flowers besides the dandelion. The wild Clematis, or Traveller's Joy (*Clématis Vitálba*), common in chalky soils, whose greenish-white flowers grow in large clusters, and entwine the neighbouring bushes during the months of June and July, may be seen in winter covered with downy heads, and resembling, in the distance, bushes partly clothed by a snow-storm. I have seen woods where this plant was in much abundance, which were in December decked with it for a great extent, and their appearance was extremely beautiful. The various kinds of thistles, and the common groundsel, which you have so often gathered as food for your canary, are also instances of a similar structure. The feather, or crown, as it is called, of some seeds, is placed immediately upon the seed, when it is said to be sessile; while in others, as in the dandelion, it is connected with the seed by a kind of stalk, and termed stipitate.

Another plan of dispersing seeds for the growth of plants of another summer, may be observed in the common Burdock (*A'rctium Láppa*), a plant which is very frequently seen on roadsides, with flowers of a dull purple colour, and very large leaves—the largest perhaps that are to be found in our hedges. The stem of the plant is about three feet high, and it blooms in July and August.

The Burdock, though possessing less beauty than many other plants, is useful both in medicine and food; being eaten either as a salad or a boiled vegetable: and the young stalks are said when cooked to have the flavour of asparagus. The bristly heads of seeds, or burs, as you may perhaps call them, are often thrown by children at each other in sport; and their adhering either to clothes or to the fur and wool of animals is caused by the heads containing the seeds being thickly set with bristles. Being by these means carried from place to place, and scattered abroad by the wind, they alight upon a soil suitable for them, where they lie during winter, and spring up at their proper season. The bristly head is the calyx, or flower-cup, from which the purple flower has died away.

The coloured part of a flower, the flower as by preeminence you would call it, is termed the corolla. This is red in the rose, and purple in the violet. It is generally supported by the calyx or flower-cup, which forms its outer covering, and is, in the different flowers, of various shapes. The calyx serves as a protection to the delicate corolla; and you may observe that before the flower is wholly expanded it is generally longer than the bud, and almost envelops it. This is very visible in the rose-bud, the contrast of whose green calyx with its bright red corolla renders it so beautiful.

Some flowers are destitute of a calyx, as the tulip;



Rose Bud. *a*, calyx; *b*, corolla in the bud.

and some others, like the poppy, lose it so early, that you would probably think them naked, as flowers are called whose calyxes are wanting.

The fruit of the common Avens (*Géum Urbánem*), a little yellow flower growing in the hedges, is not only, like the calyx of the Burdock, a small ball of spines, but is covered with a clammy substance, which affords an additional facility for its fastening itself to any object that comes in contact with it.

Various provisions for maintaining the abundance of nature present themselves continually, in one form or other, to all who observe the construction of plants; and perhaps there is no part of this interesting study that displays more clearly the use of means suited to a proposed end, than the means for dispersion given to the seed. The awn, which is attached to the seeds of some plants, as the grasses, pierces the earth and carries the seed along with it; and the tail joined to others, as the geranium, performs for them the same office; while others, as those of the maple (*Acer*), are furnished with a kind of wing.

The Furze, or Whin (*U'lex Europæus*), which grows so commonly on our heaths and waste places, is provided after flowering with pods which open when ripe, and disperse their contents: and they may be heard far off on a warm summer's day, making as they open a loud crackling noise, and adding to the many pleasant sounds of nature. The bright yellow flowers of this shrub were so much admired by Linnæus, that when he first beheld them he fell upon his knees, enthusiastically lamenting that his own country, Sweden, was destitute of such an ornament, and envying England its possession. The furze, although so common in England, is rare in the Highlands of Scotland. It is occasionally planted on high banks, especially by those road-sides where a hill has been cut down, where it renders the soil firmer, and prevents its crumbling and injuring the newly made road. The earth in such situations generally falls from above until it meets this shrub, when forming a deposit around it, it is soon covered with wild flowers, whose roots hold the soil together. Furze cut into small pieces is often used by gardeners to improve the soil destined for strawberry beds. It serves too for an excellent hedge, as its prickles resist intruders; and the cottagers who live in the neighbourhood of a common collect its dry branches and make an enclosure to shield their cattle from the inclemencies of the winter storm, while their children assemble around a cheerful fire, for which it serves as fuel.

The furze blooms profusely, and sends upon the air its delicate fragrance, over those arid and barren rocks that surround the island of St. Helena — that island where Napoleon, once the dread of nations, ended his turbulent life in gloomy exile. Often as the voyager sails by its shores, the golden blossoms of this shrub bring to his memory the heath-lands of England, where the ragged donkey feeds, and groups of merry children meet at their evening sports.

In order that you may acquire a more extensive acquaintance with the manner of dispersing seeds, you should always, upon looking at a plant, endeavour to ascertain in what manner it is to be reproduced. White, in his Natural History of Selborne, tells us, that he found during autumn several plants of horse-bean in his field walks where they had not grown before. He accounted for their appearance by supposing that the beans had been brought thither on the preceding summer from a bean-field at some distance; and that having been hidden in the earth by birds, particularly by jays and magpies, they had been forgotten by them. He also mentions having found peas under similar circumstances.

Rooks are notorious for their depredations on the fruit of our walnut-trees; and it is not unlikely that in places where these and other trees have sprung, apparently self-planted, their plantation has been effected by these indefatigable little thieves.

You, who are accustomed to walk in the woods, have doubtless discovered, during autumn and winter, small hoards of the different kinds of nuts; laid up probably by the care of the little wood-mouse, which some casualty has prevented from enjoying its treasure.

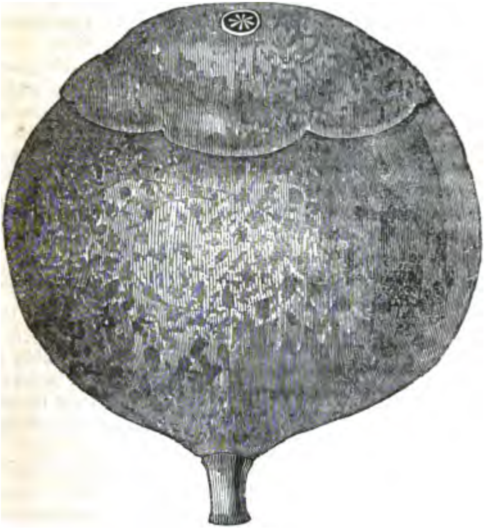
In some of our wild plants, the pods of seeds not only open in dry weather, but throw their contents to a considerable distance, and with much force. This is the case with the common violet (*Viola odoráta*); and you may derive much pleasure during your country walk, in examining the singular construction of the seed-vessel of this flower. This capsule is divided into three valves, to each of which the seeds are fastened. The seeds are exposed to view by the bursting of the seed-vessel; and they remain in this situation until the valves, being dried and rendered hard by the heat of the sun, shrink and press upon the oblong seed; and sliding down over its shining surface, throw it with a sudden jerk to the distance of two or three feet. The capsules will retain this power if they are gathered and laid in a sunny place to ripen.

I once accompanied some friends to a botanical garden. While stopping to inquire the name of a plant that was near to us, a young lady passed her hand carelessly over it; when the seed-vessels ejected their contents with so much force as that some of the seeds reached her face. To the great amusement of the party, the lady stepped hastily back, exclaiming, "What have I done?" supposing she had disturbed a nest of insects. The seeds belonged to a plant found wild in some of the northern counties of England. It was the Touch-me-not (*Noli me tangere*). The plant is not very beautiful. It is generally about two feet high, and the flowers are yellow, spotted with orange. The capsules containing the seeds separate upon discharging them into valves; and each division rolls itself quickly up. But the power of ejecting its seeds subsides shortly after the plant has been gathered. Intending to exhibit this singular property of the seed-vessel to a friend, I carried away a piece of the plant; but upon applying my hand to it, about an hour afterwards, I found the pods had lost their irritability and remained motionless. The situations in which the Touch-me-not may be found growing wild, are thick damp woods; and if you should at any time visit Northumberland, I should recommend you to search for it, as it has been found in several parts of that county.

There is a tree mentioned by St. Pierre, as growing in the West India Islands, called the Genipa tree, whose fruit containing the seeds falls upon the ground and bursts open with as loud a noise as is made by the discharge of a gun. This remarkable manner of bursting is a singular provision for numerous little creatures which depend greatly upon this fruit for subsistence. The land crabs of these islands live in the trunks of trees, feeding almost entirely upon vegetable substances, especially on the fruit of the Genipa tree. Unable to ascend the tree to satisfy their hunger, these little animals would have no resource but to watch under it, awaiting the fall of the fruit, were they not warned of this circumstance by its loud report.

Nor is this benefit confined to the crabs. They, in their turn, are destined to afford food for man; and the negroes who labour in the sugar islands obtain from them an important addition to their usual fare. May we not, as we consider this arrangement, exclaim with the Psalmist, "These all wait upon Thee, that Thou mayest give them their meat in due season: that Thou givest them they gather: Thou openest Thine hand; they are filled with good"?

A very singular plant seen by Webster, at Para, called the Pot tree (*Lecythis ollaris*), has a seed-vessel so exactly resembling an old rusty iron pot with a lid, that our author says it might easily be taken for an old pot brought from the ruins of Herculaneum. This singular capsule is full of nuts, and when it is quite ripe the lid falls off, and the seeds are thrown upon the ground. The natives make use of the capsule for a vessel to hold water.


Fruit of the Pot Tree.—*Lecythis ollaris.*

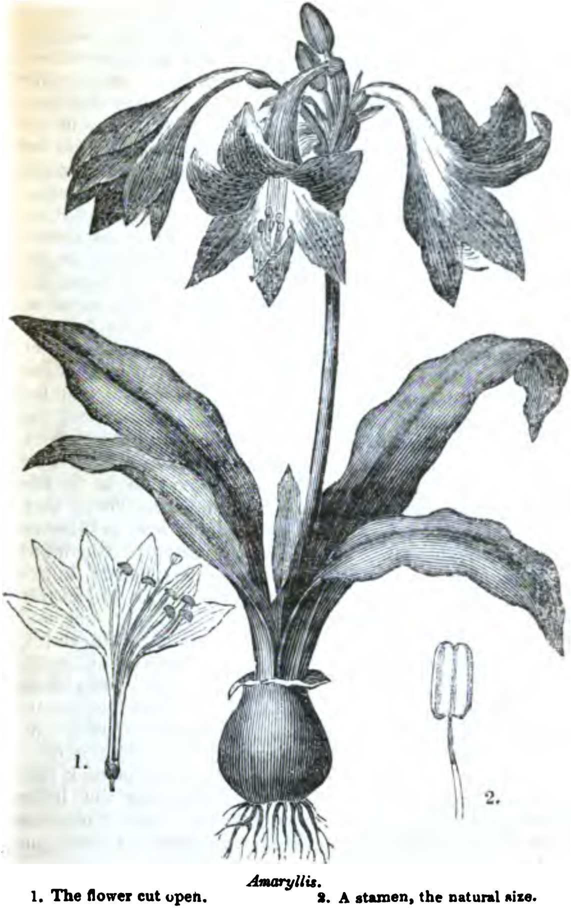
The waves of the ocean convey to its shores so many seeds from distant countries, that several plants growing on the coasts of our island, and considered native to it, are probably of foreign origin. A plant found in great abundance on the Orkney Islands, called the Molucca bean, has its seeds thrown upon them by storms of westerly winds. These beans are of several distinct species, and are none of them the productions of these islands or of the neighbouring country, but are natives of America and the islands of the West.

The Orkney Islands are almost destitute of trees; none except the hazel and a few low shrubs flourishing on any of them; but they are partly supplied with timber by the waves washing upon their shores the trunks of trees, which the storms of other lands have rooted up and thrown upon the waters.

The Guernsey Lily (*Amary'llis Sarniénsis*), a plant very ornamental to our gardens, is not, as you may suppose, indigenous to the island of that name. It is a native of Japan; and to the melancholy circumstance of a shipwreck we owe its production in Europe. The fragments of a Dutch or English vessel, beaten by the storm, were washed on the strand at Guernsey; and the seeds of this beautiful plant, intended probably to adorn the garden of one who loved and cherished flowers, sprung up unheeded, and watered only by the showers of heaven, to deck the land that bordered his grave.

Many of the trees which are growing on high rocks, walls, and other places, where we cannot suppose them to have been borne by the hand of man, are the produce of seeds, which, after having been swallowed by birds, are deposited on those spots; and this is among the most frequent methods of dispersing seeds.

You cannot have failed to remark how often, in the wise arrangements of the Author of Nature, one object is made to serve for numerous purposes. Take, for example, a meadow clothed in the flowers of spring or summer. We cannot doubt that its blooming colours were destined especially for the enjoyment of mankind;



Amaryllis.

1. The flower cut open. 2. A stamen, the natural size.

and He who formed them has implanted in our hearts a taste for their beauties. Perhaps, too, they delight the sight of birds and insects. The upholsterer bee (*Osmia papaveris*) selects for the lining of her nest the petals of one of our most glowing flowers, adorning her little dwelling with the scarlet poppy, and skilfully contriving to place her delicate tapestry with unwrinkled smoothness. The child, won by their beauty, plays amidst the flowers, binding nosegays of cowslips, or wreathing garlands of daisies. To man their contrast with the soft and beautiful verdure, their association with bright skies and pure air, the quiet and repose which seem to pervade all nature, and the happiness enjoyed by the numerous inhabitants of the meadow, afford a solace in affliction, or add a charm to hours of enjoyment. At some seasons, when the mind has been gladdened by a contemplation of the beauties before us, we can well sympathise with the feelings of the good Izaak Walton, when he said, "When I sat last on this primrose bank, and looked down these meadows, I thought of them, as Charles the Emperor did of Florence, that they were too pleasant to be looked on but only on holidays." The physician views them with a different eye. He regards the flowers as blossoms of plants that shall afford him the means of alleviating suffering; while the botanist beholds before him a field for investigation, the results of which will furnish to himself and others a source of knowledge that may assist in the production of new species of plants, and in the discovery of many properties hitherto unknown. The bird seeks food for herself and her little ones in the seeds of many flowers, and in the leaves of others: the bee extracts from them honey for the use of man: the butterfly sips their nectar for her food; and the cattle lie down to repose upon their elastic stems, or seek their daily meals from their herbage; cropping the leaves and stems, but leaving untouched the brilliant blossoms which are designed to continue the plant by producing its seed.

Letter III.

Profuseness of Vegetation—The Ivy—Effects of planting Trees—Effects of cutting down Trees—Dripping of Water from Trees—Tree in the Canary Islands—Clove Tree—Preservation of Seeds—Abundance of Seeds—Uses of Seeds as Food—Beauty of Fruits—Origin of several Fruits—Berries of Cold Countries—Mountain Ash—Grasses—Corn Plants—Bread of Kamschatka—Bread of South America—Bread-Fruit Tree—Date Palm—Grasses constituting Verdure.

In consequence of the numerous and suitable plans for distributing over the face of the world the means of its fertility, the earth is full of plants. Wherever we look around us, except it be in the busy city, or on the road trodden down by the foot of man, we see the variety and profusion of the vegetable kingdom. The muddy shore is covered with one species of plant, the rock with another; while the margin of the salt-spring and the shores of the ocean abound with saline plants. Even the old and mouldering wall of the city, at whose base perhaps the pavement presses so closely that only a few small weeds can find room to spring up, displays upon its summit the bright and fragrant wall-flower, and the red and white dragon's-mouth. Its surface too is thickly covered in many places by a small green moss; and this same plant gives to the stagnant pond that green hue which was long supposed to be produced by insects. And then the ivy (*Hédera hélix*) throws its luxuriant foliage over the ruined arches, and contrasts with the decay which time has wrought; as if to show how far more lasting are the productions of nature than those of art; how superior the commonest works of God to the noblest performances of man.

Whenever a soil which has long lain undisturbed is turned up anew, a fresh stock of plants arises without the aid of culture. On some spots of uncultivated ground, where few plants, except the heath and the blue heather-bell, had grown for many years, the introduction of trees has produced another description of plants. In the course of time their leaves fall off, and by manuring the ground improve its nature; besides that, the shelter afforded by their boughs is favourable to the growth of some plants, as the wood anemone (*Anémone nemorósa*), the sweet lily of the valley (*Convallária majális*), and the other flowers that frequent the woodlands. Instances are common where, almost immediately after the plantation of trees, a fine crop of white clover (*Trifólium répens*) has sprung up abundantly. The seeds of the clover are facilitated in their dispersion by the light wings which form its corolla; and this plant is often produced upon a new soil in places where it cannot be remembered to have ever grown before.

But, on the other hand, the vegetation of seeds is often delayed by the deep shadow cast over the spots where they are lying; and the cutting down of trees and underwood has effected great changes in the vegetable productions of some portions of land. On grounds whence woods have been cleared, the woodland flowers have disappeared; but plants whose nature required light and air have arisen in luxuriant profusion in places where, in the memory of man, they had not previously existed.

The author to whom I before referred, Mr. White, tells us, that on the removal of some beech trees that for many years had grown on a spot in his neighbourhood, there sprung up spontaneously a number of strawberry plants. There was a tradition in the village that strawberries had formerly grown on that place; and it is most probable that they had flourished there before the planting of the beeches. In this instance, as well as in cases where clover has been produced, the seeds were already lying dormant in the soil; and, upon this improvement of its nature, they awoke and filled the earth with renewed fruitfulness and beauty. How well might the Psalmist exclaim, when contemplating the wonders of nature, "Oh, Lord! the earth is full of thy riches!"

By far the greater number of plants require sunshine to bring them to perfection. The thick foliage of trees not only prevents the sun's rays from penetrating it, but its frequent dripping in cloudy weather upon the ground beneath it, is extremely injurious to the plants in such situations. You may often see the leaves of trees covered with small drops of water, which are caused by the mists and fogs having condensed upon them; and this drops off upon the earth, not with the lightness of a summer shower, but in sufficient quantity to clog the ground, and bend the tender leaves and stems of the herbage.

Trees planted in dry situations have especially a great power of attracting the vapours that float on the air; and travellers tell us of a single tree on a mountain of Ferro, one of the Canary Islands, which attracts so much moisture on its leaves as to form the grand supply of water to the natives of that island. This tree is always surrounded by a cloud, which settles in water upon its foliage, under which vessels are placed to receive the continual droppings. This circumstance is accounted for by St. Pierre, who supposes that the mountain attracts the vapours of the atmosphere, and that the tree being placed immediately in the centre of the attraction, collects them around it.

The clove-tree (*Caryophyllatus*), a native of some of the Molucca Islands, and the tree from which the well-known spice is procured, collects the vapours in a very remarkable manner, its foliage being always covered with moisture; and the land underneath this tree is not adorned by a single flower or one little spot of verdure.

If you should at any time wish to preserve seeds for future planting, you will find it of the greatest importance to keep them dry, as moisture will cause a fermentation to take place that will destroy their vitality, and thus render them useless, or it will cause them to vegetate before the time when they can be of any service. Yet, although this is the case with respect to seeds exposed to air, it is evident that their living principle is not only uninjured by moisture while they are lying in the ground, but that

Caryophyllatus aromaticus.

its presence is one of the necessary conditions for their vegetating. Nor is the vital power of a seed injured by its exposure to excessive cold, nor to any degree of heat short of boiling; so that the seeds of many plants may be brought from far distant countries and kept for years, yet will upon planting be found productive if preserved from insects and moisture. Many very valuable exotics have grown from seeds taken from the dried specimens which were collected some years before by botanists.

Seeds should be wrapped in coarse brown paper, and you must be careful to ascertain that you do not enclose any insects with them. Time alone will, however, destroy in some seeds the vital principle. The seed of the common parsnip will be useless if kept more than a year, and there are some seeds that will perish if not planted immediately; while those of the common melon have been known to germinate after being kept forty years.

Seeds newly gathered will appear above ground much earlier than those which have been previously dried: the latter will very often remain a whole year in the ground before any change is produced. When, however, fresh seeds are planted under the most favourable circumstances, the length of time before they rise above the ground varies considerably in the different plants to which they belong. You have perhaps experienced much pleasure in watching the progress of mustard and cress, and been gratified by the appearance of the plants so soon after you have sown the seed. This quick vegetation is also exhibited by the various kinds of grasses, which spring up in a day or two after the grain is deposited. Others, as the nuts in general, lie a year or two in the ground before their powers commence; while the subsequent development of their plants is slower, and their duration far greater.

As the seeds of many of our little meadow flowers are chiefly designed as food for the different kinds of birds, they are on this account much more numerous than would be necessary were they merely intended for supplying a continual succession of the plant.

Were the seeds produced by a single plant put into the earth, and the whole of the crop yielded by them again planted, and this plan annually pursued, in a very few years the whole surface of the earth would be too small to receive the produce of a single flower.

The seeds of many plants are designed for the food of man. The different kinds of peas and beans form not only a pleasant vegetable, but contain a large portion of farinaceous or flour-like substance, which affords a considerable degree of nutriment. Many seeds are enveloped in fruits; and the kind providence of God, which has so arranged all nature that the wants of all His creatures should meet with an appropriate supply, has ordained that those countries where, owing to the heat of the climate, much thirst is experienced, should be abundantly stocked with juicy and refreshing fruits. In our own land the greater number of fruits, especially those of a juicy nature, ripen either during summer or autumn, at a period when the warmth of the weather renders them peculiarly valuable, both for allaying thirst and reducing the heat of the system.

The hard and oily fruits, which are intended for our use during the winter months, are adapted for keeping until the return of summer shall give us again the grateful supply of the cherry, the currant, the gooseberry, and the plum.

The fruits of tropical climates are very superior to our own in number, size, and richness of flavour; and many fruit-trees which have become common in our gardens from frequent plantation are natives of warmer countries. With respect to the plant, the various kinds of fruit are merely seed-coverings, affording protection to the seeds contained within them; and if not eaten by man or animals, improving, by decaying around the tree, the soil on which the seeds fall. They add greatly to the enjoyment of the human beings for whom they were especially created. Some fruits are extremely beautiful in appearance—scarcely less so than the blossoms which preceded them. The group of red cherries glistening amid the foliage of the orchard trees; the long bunches of clear sparkling red or white currants which droop among the bushes; and the rich clusters of purple grapes, glowing amongst the vine leaves, are extremely ornamental.

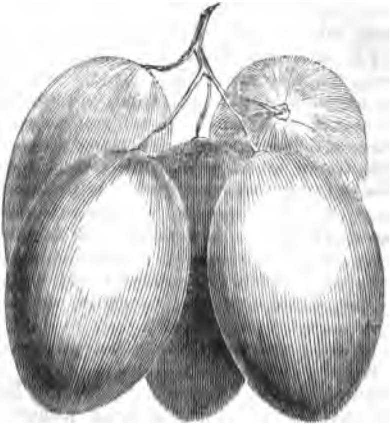
Children are always fond of fruit, even of the commonest description, as the wild sloe and the blackberry. How often, of an evening, do we see groups of children returning into the town from their walks among the neighbouring lanes and hedges, their small baskets full of these fruits, which, valuing perhaps in some measure according to the trouble they have had in procuring them, they gaze at with delight and display with exultation! Do you remember how Cowper describes his early taste?

> "For I have loved the rural walk through lanes
> Of grassy swarth, close cropp'd by nibbling sheep,
> And skirted thick with intertexture firm
> Of thorny boughs; have loved the rural walk
> O'er hills, through valleys, and by river's brink,
> E'er since a truant boy I pass'd my bounds
> T' enjoy a ramble on the banks of Thames;
> And still remember, nor without regret
> Of hours that sorrow since has much endear'd,
> How oft, my slice of pocket store consumed,
> Still hung'ring, pennyless and far from home,
> I fed on scarlet hips or stony haws,
> Or blushing crabs, or berries that emboss
> The bramble, black as jet, or sloes austere.
> Hard fare! but such as boyish appetite
> Disdains not; nor the palate undepraved
> By culinary arts, unsav'ry deems."

The vine, which, from the time that "Noah began to be an husbandman," has contributed its clusters to the refreshment of mankind, though, like many other of our blessings, it is often perverted, evidently originated in Asia, from whence it was carried into Greece. It is supposed to have been introduced by the Romans into England, as early mention is made of it soon after their settlement in Britain in some of our ancient records.

The vineyards of France are not beautiful; the vines are kept low, and, being trained upon short poles, have an ungraceful appearance; but in Italy, that land of beauty, favoured alike by nature and art, the vineyards are very picturesque. Tall poplars and elms grow in her vine plantations, and around these trees the vine clings, hanging its beautiful festoons from one tree to another, so as to form a natural trellis-work, on which the leaves intermingle with the rich pendant fruit. And again, too, over the cottages and the rustic garden bower, this plar throws its luxuriant foliage, forming at once a pleasing shade and a graceful adornment; just as the rose and the starry white jessamine cluster in rich beauty over some of the summer arbours or cottage-homes of our own land.

The grape is not a native of the torrid zone, but it will flourish only to any great extent in countries where the summer's sun has considerable power. In many parts of Europe, Asia, and America, it grows wild; either trailing against trees, or over sunny hills and old walls. Its cultivation for wine is extended over the countries from the twenty-first to the fiftieth degree of northern latitude.



Grapes of Palestine, natural size.

The peach (*Amy'gdalus Pĕrsica*) we derive from Persia. The cherry (*Prunus cerăsus*) is a native of Britain, and was first cultivated at Sittingbourne, a village in Kent, a county yet remarkable for the number and beauty of its cherry orchards. You have perhaps gathered the wild cherry of our woods, a small fruit, and one of little worth to any but the schoolboy.

The plum (*Prúnus doméstica*) is a native of many countries both of Europe and Asia. You would not perhaps easily detect in the wild and harsh sloe-berry the origin of any variety of the cultivated plum; yet some varieties are derived from it, and are a good illustration of the value of culture.

The apple (*Py'rus málus*) grows in climates moderately cold. It is by some authors stated to have been brought from the East; but for many centuries its wild species, the crab-apple of the wood, has grown among us, and it is by many considered indigenous. The pear (*Py'rus commúnis*) is also thought to have been derived from the wild pear.

We often see the beautiful walnut-tree (*Júglans régia*) extending its massy foliage above the cottage. Its leaves, which emit no fragrance while hanging on the tree, produce, when bruised in the hand, a pleasant odour. Of their power in tinging with a deep brown the fair complexion, you have often heard when in the nursery; your young mind was harrowed with tales of children carried away by gipsies, and stained with walnut juice, to prevent their recognition by their friends. The walnut-tree, whose fruit is so useful both for pickles and for the dessert, grows wild in Persia, China, and Russia.

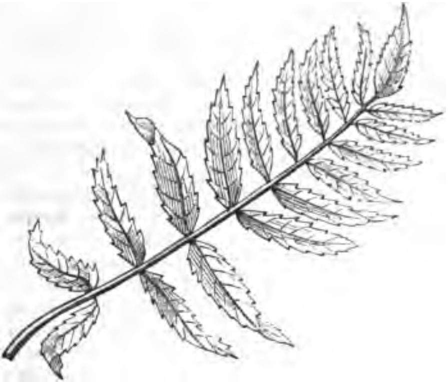
The apricot (*Prúnus Armeníaca*) and many others, though transplanted from hot countries, will grow well with us in the open air: but it is only in the hot-house that the luscious pine-apple, the mango, and some other tropical fruits, will grow in England.

Some of the northern and cold countries of Europe, as Sweden and Norway, produce a great quantity of large and beautiful berries. "I have seen," says St. Pierre, "a display of cherries and gooseberries with ruddy tints in barren districts of Finland, and on soils where, as on the tops of the alpine mountains, rocks appeared to form the only surface." The same countries produce the juniper and the cloudberry (a fruit in colour and size resembling the mulberry), while the woods are thick with raspberry-bushes. Dobell thus describes the berries of Kamschatka—and his description will give you a very good idea of the fruits of northern countries:—" After climbing a bank, I found myself in a large forest of poplars, aspens, birches, spruce-pines, and alders, many of them trees of a fine growth. Amongst the underwood I perceived some bushes full of large red berries, which, to my astonishment, I found to be red currants, of a very large size and high flavour, but possessing a much keener acid than those of our gardens." No doubt cultivation would improve them. In another place our author found " several sorts of good berries, raspberry, red currants, whortleberry, cranberries of two or three sorts, moroshkas, and, the most delicate of all, a species of wild strawberry, possessing a very high aromatic flavour. The berries of the mountain ash, called in Russia *Rebina*, are better in Kamschatka than in Siberia or Russia; as is also a small wild cherry called the *Cheroonka*. I ought also to mention the heath berry, and a red berry that grows on a very small shrúb, called in Russia *Broosnika*, which are there in great plenty. The cranberries are likewise plentiful, and certainly the largest and finest I ever tasted. However, I have met with none of these berries fit to be eaten without sugar, though the natives certainly make use of them in a natural state, and think them very sweet."

The peculiar excellence of all these berries is that, notwithstanding the great quantity of snow which covers the ground during the winter of these countries, and which sometimes almost overwhelms the trees and bushes for many weeks, they are quite uninjured, and retain their life and flavour during the severest season.

The mountain ash (*Py'rus aucuparia*), spoken of by Dobell as frequent in the woods of Northern Asia, is probably known to you. The leaves grow opposite each other, in a manner called by botanists pinnated: by which is meant, that several pairs of leaflets are situated on one common stalk.

The tree bears in summer clusters of numerous small red berries, each of which you will find upon examination is formed exactly like an apple. Although this tree does not with us attain to so large a size as in colder countries, it is very ornamental to our shrubberries and woods. You have perhaps sometimes eaten of its crude but beautiful fruit; or you may have seen your sisters string it for necklaces. By the Highlanders the mountain ash is called the Rowan tree, and they superstitiously imagine that it protects from evil spirits the habitations near which it grows; on this account it is cherished near many a Highland dwelling.



Pinnated leaf of the Mountain Ash.

The seeds of the various kinds of grasses, in which are comprehended wheat, oats, barley, rye, millet, rice, and maize (which are usually termed Corn plants or Cerealia), form an important and extensively used article of food. None of the corn plants flourish without culture, but they will so easily accommodate themselves to various soils and climates, as that they are found spread over a greater portion of the globe than any other order of plants.

The cultivation of European corn is not successful either in regions lying near the poles, or in the hot countries between the tropics. In England, bread made from wheat is so common an article of food, that when in former

Ear and Plant of Spring Wheat.

times the crops of wheat and barley failed, a season of famine and distress was the consequence. Owing to the subsequent improvement in agriculture, we need not fear a similar calamity; and even though the wheat, the barley, and the oats should fail, we might derive a temporary supply from the nutritive matter contained in the potato and some other plants. It is said that a good bread may be made from the horse-chesnut, and even from the roots of the common bryony.

The inhabitants of some parts of Scotland make their bread chiefly of oaten flour; and the people of the United States derive their chief produce from the maize plant. In Eastern countries rice and millet constitute the great means of support; and in almost every land a bread procured from the farinaceous matter contained in vegetables is adopted as the chief article of daily consumption.

Maize is a very tall and handsome grass plant: you have perhaps seen it cultivated in a garden for its beauty. It is about six feet high. The leaves that envelop the large husks of seeds are worthy your notice. Delicately soft on that side near the young husk, the outer surface is covered with the thick fibres that extend from the top to the bottom of the leaf, and are of so great strength that it is almost impossible to break the leaf. A long silky tuft hangs from the ear, of singular softness and beauty, and gives the plant, previously to ripening, a most elegant appearance. Maize will grow in any country whose latitude is not higher than forty-six degrees, but its cultivation in England has not been successful. Cattle are remarkably fond of this corn.

Rice constitutes the grand article of food of the inhabit-

Ear and plant of Winter Wheat.

Maize—*Zea Mays.*

ants of China, and the greater part of India. As it will grow only in land that can be occasionally covered with water, and as marshy situations are unfavourable to health, the poor labourer who cultivates the rice-grounds generally leads a life of suffering, and sinks to an early grave. Artificial means are resorted to in many plantations in order that the rice may be completely flooded, and the water is generally left on the plant for ten days after the grain is set.

Rice-Grounds of Canada.

Ear and Plant of Rice.

In India and China rice is dressed in various ways; but in England it is little used except for puddings, and as one of the ingredients of mixed dishes. Bread made from it soon becomes hard and dry.

When eaten occasionally, or mingled with other food, rice may be considered nutritious; but it is, indeed, a poor diet when depended upon solely for subsistence. It is, when growing, a tall grass, and has awns upon it like the barley. Its leaves are very firm and rigid.

Millet is a grass producing a small round seed, one species of which is used in England for puddings. In India, as well as in many other parts of Asia, and some parts of Africa, it is cultivated extensively; and in Nubia scarcely another species of corn receives any care, while this is very abundant; the Nubians depending upon millet as their chief article of food.

Common Indian Millet, called in Nubia "Durra," or "Holcus Sorghum."—Linn.

In the cold regions of Kamschatka, where the corn plants will not attain perfection, the poor inhabitants live almost entirely upon fish and a kind of bread made of the bark of the Scotch fir (*Pinus rúbra*). This bark they strip off the tree in spring, and dry. After toasting it at the fire, they grind it, and steep the flour in warm water to remove its resinous taste. They then make it into cakes and bake it. This bread can affor but little nourishment, and to those unused to its flavour it is very unpalatable; yet the poor Kamschatkans become by use fond of it. In Norway and Sweden the peasantry, some of whom are very poor, live for half a year at a time almost entirely upon this bread.

The wild tribes of South America scarcely seek any other food than that furnished them by the Banana (*Músa*

Banana, or Plantain.

Date-Palm.

sapiéntum), a valuable tree peculiar to hot climates. A mealy substance is extracted from the ripe fruit by cutting it in slices, drying it in the sun, and then pounding it; but the amount of nourishment contained in this substance is far less than that yielded by an equal portion of wheat, or even the potato.

In the regions between Barbary and the Great Desert, the soil, which is of a sandy nature, is so much parche by the intense heat of the sun's rays, that none of the corn plants will grow; and in this arid district, called the Land of Dates, the few vegetables that can be found are of the most dwarfish description. No plants arise to form the variety of food to which we are accustomed, and the natives of these districts live almost exclusively upon the fruit of the date-tree. A paste is made of this fruit by pressing it in large baskets. This paste is not used for present supply, but is intended for a provision in case of a failure of the crops of dates, which sometimes occurs, owing to the ravages committed by locusts.

The date, in its natural state, forms the usual food; and the juice yielded by it when fresh contains so much nutriment as to render those who live upon it extremely fat. As by the Moors great corpulence is esteemed an indispensable requisite of beauty, the ladies belonging to the families of distinction among them nourish themselves during the season solely with the fresh fruit, and by continuing this regimen during two or three months become of an enormous size.

The date-palm flourishes very generally on sandy soils in the hot countries of Asia and Africa. Not always, however, is the soil that supports it barren as the one I have described. It is very frequently found by streams; and as the tired traveller sees its foliage waving afar, he hastens towards it, hoping to find a stream of water. Sometimes its tall stem is surrounded by beautiful climbing plants, and the most brilliant flowers flourish beneath its shadow.

This palm frequently attains the height of sixty feet, and stands perfectly upright; unlike in this respect some other species of palm, whose slight forms yield to the wind. It was to this tree that the Psalmist alluded, when he said, "The righteous shall grow as the palm-tree"—firm and unmoved by the shocks of temptation and the storms of adversity. The clusters of dates are sometimes five feet in length, and when ripe they are of a bright gold colour, over which the summit of the tree is crowned with a beautiful foliage.

The natives of the South Sea Islands receive a bread,

Bread-Fruit Tree.

without any preparation, from the bread-fruit tree (*Artocarpus*), of which there are many species. The fruit is the size of a loaf, and it grows in so much abundance that half a dozen of these large trees will yield enough for the demand of a family during the whole year. The taste of the fruit is very similar to that of toasted bread. This tree has been successfully cultivated in the West India islands, and many other countries of hot climates.

In order to give you some idea of the vegetable food of the people whose bread is not made from any of the corn plants, I have digressed from my observations on the grasses, to which I shall now return.

The plants constituting the verdure of our meadows, to which we most commonly refer when we speak of grass, are common to all climates; and grassy plains may be found in the frigid, temperate, and torrid zones. It was from the bright green hue of its grass that Ireland obtained its poetical names of the "Emerald Isle" and the "Gem of the Ocean;" and foreigners, upon approaching England, are often struck with the beauty of its verdure, which is owing to the moist air of an island climate.

Superior in brilliance as are the flowers of the torrid zone to those of our island, their pasture-lands cannot at all compare with ours. The grass is either withered by the scorching heat of the sun, and presents a brown and faded appearance, or it is so thick and coarse as to bear no resemblance to the soft and yielding grass of the English meadow.

Only during the rainy season is the grass of India bright and beautiful; and at that time it can be enjoyed but by looking upon it from within doors, as the rain is so heavy that an exposure to it would not be unnecessarily incurred. As soon as the showers penetrate the earth, the grass springs up with inconceivable rapidity; and barren places present in the course of a few hours an aspect of verdure that reminds the native of temperate regions of the green fields where he once loved to wander.

Grass plants have three different means of propagation. Their seeds are scattered over the earth by the winds, or

Group of the Flowers of the principal British Grasses.

are carried afar by birds; and they will also increase by means of shoots which are formed at the lower parts of their stems, and by creeping branches which they send out to a great distance.

The value of grasses, as affording bread for man, pasture for cattle, and seeds for the support of the little birds of the air, is enhanced by the fact that one plant only among them possesses a poisonous quality. This principle is contained in one of our meadow grasses, the Bearded darnel (*Lólium temuléntum*), which, if used in bread, is of an intoxicating nature.

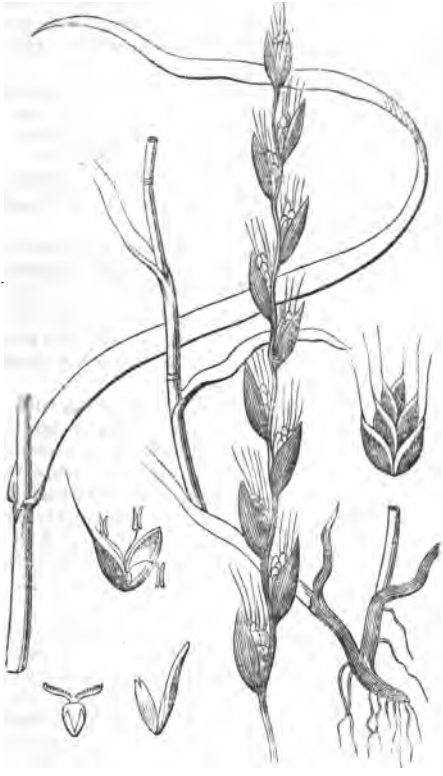
In some parts of Italy and Turkey grass plants attain the height of twenty feet; and in many countries of Africa, in Congo especially, the grass is so high and thick as to become a hiding-place to noxious reptiles and beasts of prey. The negroes often consume the grass by fire to a great distance, in order to drive away these formidable enemies.

On the sandy deserts of Africa grows a wild grass about a foot and a half high, whose panicles are formed of a bunch of thorns. These thorns are very strong and sharp, and no animal will venture near it to graze, neither will the unclothed Hottentot attempt to approach it.

In some parts of India the lands are thickly covered with a very tall grass which bears on the top of its stems large bunches of white seed-vessels, whose growth is so singular as to give the field the appearance of having a flock of sheep scattered over it.

The beautiful green hue of our meadows in spring gives a charm to the landscape on which the eye loves to repose. As the grass bends before the wind, or the bright light of the sun is upon one portion of the field, giving a brilliant tinge to its colour, and the shadow of a cloud is cast upon another part, forming a contrast by its sombre hue, we look upon it again and again, to find fresh beauty every moment in the verdant scene opened before us.

In Lapland, where the winters are extremely cold, the natives contrive to shield themselves from its severity by putting in their boots and gloves a species of grass



Lolium Temulentum.

dried. They comb this grass and rub it in their hands. They then place it in their boots in such a manner as to secure their legs as well as feet from cold; and severe as are the winters of this country, the Laplanders are thus preserved from chilblains. Their shoes are not made, like ours, of tanned leather, but of raw hide; they are therefore very thin, and the grass affords an excellent means of preventing their feet from being hurt by the stones.

In India, a light cloth is made of some species of grass, which forms a clothing well adapted for the heat of the climate, and which is sometimes manufactured with so much skill as to equal in delicacy of texture the French cambric.

In the Nicobar Islands, situated at the entrance of the Bay of Bengal, the natives wear no other clothing than a petticoat made of dried grass; and the Japanese make their hats of a species of grass twisted together, and formed into an oblong shape.

LETTER IV.

The Woods — Misletoe — Means of its Dispersion — The Method of Germination—Druids—Value of Knowledge —Appearance of Woods in Winter—Parasitic Plants— Dodder—Broom Rape—Climbing Plants—False Parasites —Orchis Plants.

I SHALL now turn to the woods, and select for your consideration a plant which you well know—for who does not know the misletoe? I might almost ask to whom is it not dear for its pleasant remembrances? To you, I doubt not, it speaks of friends and Christmas festivities, and of the cheerful dwellings which at that season it adorns, its yellowish foliage and white fruit forming an agreeable contrast with the dark glossy leaves and bright red berries of the holly. I think it probable, however, that you may never have seen it growing; for none but those who love Nature so well as to think all her varieties beautiful seek the woods at Christmas time. This plant (*Víscum álbum*) does not fix its roots in the earth, but on trees; and is one of the plants termed by botanists parasitic, because it hangs upon another for support and nourishment. It grows chiefly upon apple-trees, but it may be planted upon any tree by making an incision in the bark, and placing in it the seed contained in the berry.

Its seeds are dispersed chiefly by means of the missel-thrush, who carries them from tree to tree. This bird is the largest of our British thrushes, being about a foot in length. His song cheers the winter woods, and at that season he lives chiefly upon the juice of the berry. He is consequently much better supplied with food than some of our little songsters; as several plants that afford them a large provision, as the plantain, have passed away with the summer, and the groundsel and chickweed are often covered with snow. The haws, too, are quite spoiled by frost; and as the severe weather sometimes sets in as early as November, the birds are thus deprived of a very large means of sustenance. Happily for them many berries, among which are the numerous ivy and privet berries, are uninjured by the severest weather, and are remarkably plentiful.

Mudie, in his History of British Birds, tells us that there is a sort of double naming in this thrush. The word missel signifies to soil. It is called the missel-thrush, because it missels (soils) its toes with the slimy juice of the berry: and the misletoe derives its name from its soiling the toes of the bird.

The manner in which this plant strikes its root is very remarkable. All roots have a tendency towards the centre of the object on which they are growing: seeds which are planted in the earth, in whatever position they may be laid in the ground, invariably strike out their roots downwards towards the centre of the earth, and send their stem upwards, to seek the light. The misletoe, however, often grows on the side of a branch, and sometimes on the upper part of it. Its roots, therefore, instead of spreading in a downward direction, tend towards the centre of the branch. If the seed be placed at the side of a branch, it will spread in a horizontal manner; if underneath it, it will extend itself upwards.

When the seed commences to throw out its fibre, it is too weak at first to pierce so hard a substance as the bark, and therefore, contrary to the usual habit of roots, it grows in an outward direction. When it has acquired more strength, it yields to the attraction of the tree, and turns round towards it: when making its way through the bark into the part of the tree next it (called the alburnum or new wood), it extracts from it the food for its growth, in the same manner that another plant would imbibe sustenance from the earth.

The misletoe-berry was formerly used very extensively in medicine, but its chief use is now in the manufacture of bird-lime; an article which, however, is oftener used for purposes of a mischievous than a useful character. This plant is regarded by the gardener, when it attaches itself to the fruit-tree, as a great incumbrance, as it deprives the tree of its vigour. It is, too, extremely difficult to destroy, as the roots are fixed in too firm a soil to allow of their complete eradication; and the only way of extirpating the intruder is the cutting off the branch on which it is hanging. On our wild trees, however, it makes a very pretty appearance, at a season when the rambler in the woods misses their summer beauties, and is glad to rest his eye on its large green bough. Although it may be found throughout England, and very plentifully in the southern counties, it is very rare in Scotland. There are nine species of it, but one only is a native of Britain.

We can scarcely mention the name of the misletoe without being reminded of the importance that this plant once had in our country, owing to the veneration in which it was held by the Druids. The Druids were the priests of Ancient Britain, at a period of our history when the most superstitious religious ceremonies were performed both by the priests and people. From their acquaintance with the natural sciences, as botany, geography, and astronomy, the Druids obtained great power in this age of general ignorance. They were chosen from among the highest families in the nation, and to their care was intrusted the education of the children of the nobility. With their pupils they retired to desert places and caves: but their chief residence was in the Isle of Anglesey, a place well supplied with the oak-tree, which they considered as the emblem and peculiar dwelling-place of the Deity. They regarded the misletoe with the greatest reverence, especially when it was found on the oak. This, however, occurs very rarely; and, as the misletoe does not now grow on the island which they frequented, it is probable that the Druids were accustomed to plant it on the oak-trees by inserting the seed. The misletoe, which they called by a name signifying All Heal, was thought, when gathered

Oak Tree.

with certain ceremonies by the Druids, to contain divine virtues; to be an infallible antidote to all poisons; and, indeed, a cure for every disease. It was diligently sought for on the sixth day of the moon, and shouts of joy hailed its discovery. The chief Druid, dressed in long white robes and attended by a multitude, ascended the tree; and with a golden pruning-knife cut off the plant, and received it in his robes. Then a sacrifice of two white bulls was offered, and the Deity invoked to bless the plant. On some important occasions human beings were offered; so true is it that "the dark places of the earth are full of the habitations of cruelty."

A life spent thus amid the scenes of nature, afforded the Druids most favourable opportunities of becoming acquainted with some of its most striking phenomena; and although it is probable that their knowledge of nature was not only very imperfect, but very incorrect, yet it was far greater than that attained by the great body of the people. Their lessons, which were taught in verse, and transmitted by memory, at a time when there were no printed books, and manuscripts were almost inaccessible, seemed to their pupils almost miraculous; and aided by their imposing and venerable appearance, which is always influential in proportion to the ignorance of those to whom it is addressed, we cannot wonder that, in an age so unenlightened, the Druids should have obtained almost unlimited control over the totally uninstructed minds of their countrymen; affording an illustration of the truth, that "knowledge is power."

The practice of dressing houses and churches at Christmas time with misletoe and holly-boughs is a relic of Druidism, and, like many other customs, is continued now that its founders and their institutions are alike forgotten. The custom is to us a pleasing one, because we have always been accustomed to associate it in our minds with the enjoyment of a season peculiarly interesting to those who are residents of the "happy homes of England." As it is no longer favourable to superstition, since few who practise it are aware of its origin, and none reverence it on that account, we cannot wish for its discontinuance. Dr. Chandler mentions that, during the times of the Druids, houses were decked with boughs, "that the sylvan spirits might repair thither, and remain unnipped by frost and cold winds, until a milder season had renewed the foliage of their darling abodes." It is rather difficult to conceive what must have been the ideas of the Druids respecting the nature of spirits, when they supposed that they needed the protection and shelter of the boughs of trees. It is probable that you will smile at the superstitious practices of the ancient Britons, and be disposed to feel contempt for the understandings of beings so deluded. We are, indeed, wiser than they; but you must remember that the wisdom of others contained in books, which has contributed so greatly to the formation of your ideas, and daily assists in their improvement, was not within their reach. The general diffusion of the Scriptures has tended indirectly to the advancement of the minds and manners of those even who refuse the admission of its truths into their hearts: while those who believe and cherish its doctrines are taught by them lessons of a holier and loftier character than were revealed to this dark season of our nation's history.

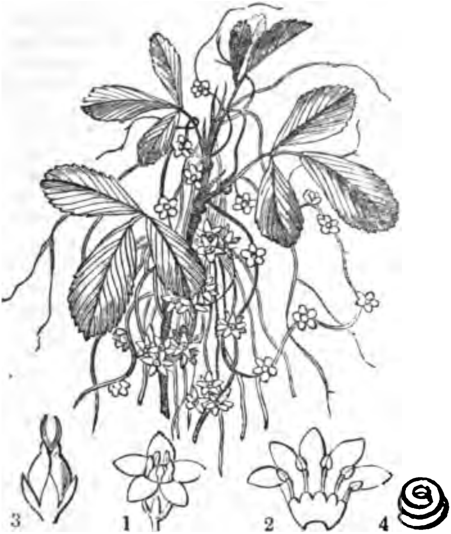
When, therefore, you are reminded, by the sight of the misletoe, of these scenes of ignorant worship, do not exalt yourself upon the superiority of your understanding; but remember that our forefathers had not the Bible in their dwellings, and feel grateful to the God who has placed you in happier times, and revealed to you a holier way of communion with himself than through the blood of your fellow-creatures.

To the lover of nature the woods are never wholly destitute of attractions. Even in winter, when scarcely a weed appears upon exposed ground, we may observe many a pretty green thing rising up under their friendly shelter; and at such times the little white flower of the common chickweed, and the lively green of the Dog's Mercury, possess a beauty which we might overlook amid the profusion of summer. The elegant bunches of crowned seeds, which the clematis is twining, perhaps, over the wild rose-bush, whose boughs, though destitute of leaves, are still covered with hips; the ivy, with its deep green leaves and groups of dark smooth berries, clinging around the rugged trunks of the oak; and the large branches of misletoe on the wild plum-tree, are objects for the eye to regard with interest and pleasure. The privet, too, retaining through the winter its foliage, is bedecked with its glossy black fruit, over which the scarlet berries of the nightshade are still drooping,—their brilliant colour tempting but to betray. Then there is the birch-tree, that "lady of the woods," as Coleridge sweetly calls it, with its silver bark; whose boughs, tipped with their delicate catkins, are still bending gracefully, and, when fringed with the hoar-frost, looking scarcely less beautiful than when clothed with the verdant foliage of spring; and the hazel-tree, upon which little clusters of dark ruby-coloured pistils are thickly scattered; and that singular little shrub, the butcher's broom, with its small flower or its cherry-like fruit, situated on the back of its leaf; and the prickly holly-bush, its hardy leaves edged with spines, or, it may be, grown smooth with age, from among which the coral berries are peeping in rich clusters. The oak has still hanging upon its boughs many a leaf either glowing in the remains of the rich yellow tint of autumn, or turned into the withered brown: and yet with its lofty trunk decked with moss of an emerald green, and its far-spreading branches, unbent by the wind, forming of itself a subject both for the poet and the painter. In its undecayed majesty, this tree presents, winter after winter, the same aspect as when we looked last upon it; appearing to the man to have scarcely grown older, than when in childhood he sought beneath its boughs for acorns. The woods contain many plants, besides, which are interesting to the scientific student, but these are too familiar to have escaped the notice of any observing person. You may rest assured that you will be well repaid for any investigation of nature, by the many new and beautiful objects it will present to gratify your taste and elevate your imagination. The careless rambler in the woods in winter would observe nothing but the cold blue sky, and as he shivered among their leafless branches, would think that all their beauties had passed away with the summer.

And let us not proceed without noticing the care manifested for his winged creatures, by Him who regardeth all. Besides the misletoe berries, the hips, the privet, and the ivy berries flourish for them; and for them the pale chickweed spreads its herbage, rising up from its seeds six or seven times in the course of a year; letting its seeds fall in profusion from their capsules, on the ground beneath, to rise upon the spot, in a new plant almost immediately after: or, scattered by the winds, to fill the woods and lanes, and hedge-banks, with food for the little creatures, whose song is to gladden the heart of man in the coming season. Then the voice of the cuckoo shall be heard; and the soft cooing of the wood-pigeon, and the pattering of the rain-drops as they fall upon the leaves in gentle and refreshing showers; and the corn will rustle in the brown field; and all nature, animate and inanimate, shall seem to sing a song of joy and praise.

As I have given you a description of a parasitic plant, it may not be amiss to mention some other plants of the same character, though they bear little other resemblance to the misletoe, than in the fact of their deriving sustenance from another. The dodder (*Cuscúta*), of which there are two British species, grows upon the furze, thyme, and even the common nettle. The smaller species of dodder (*Cuscúta epithymum*), being the more frequent, shall be the subject of my remarks. Both species are however very similar, their chief points of difference being obvious only to the botanist.

The lesser dodder fastens itself chiefly upon furze. Unlike the misletoe, it does not at first spring from the stem which supports it; but its seed germinating in the ground, the young shoot that rises from it clings to whatever may happen to be near it. This thread-like shoot then produces several small papillæ (little prominences like warts) from which spring other shoots, that send out vessels into the softer parts of the neighbouring plant: and so firmly do they unite themselves with it, that they can with difficulty be separated. This plant may be found on commons or on other exposed situations, in almost any part of England. The furze bushes growing on the heath grounds about Tunbridge Wells are covered with it during the months of July and August, when it is in blossom. It at first view appears to be a



Dodder (*Cuscuta Europæa*) limbing a trefoil.

1, a perfect flower; 2, a corolla cut open; 3, an ovary with its calyx; 4, the embryo.

part of the plant which it encircles, as no root can be discovered, that having died away in the ground as soon as the parasite had established itself.

The dodder produces a great number of red threads, which are sometimes two feet long; but it is not possible to disengage so large a portion of them, as they are so thickly interlaced with the prickles of the furze as to break in the attempt. The flowers of the dodder are very pretty. They are of so fleshy a substance as to look almost as if made of pinkish-coloured wax, and the stems are red. The plant affords a red colour, which is much used in dyeing, and some animals, as the sheep and cow, will feed upon it, but the horse will reject it.

The country people of some parts of England give the name of Hell's-weed to the dodder, because it injures the plant to which it belongs. The furze-bush, around which it entwines itself, is often killed by it.

Another parasitic plant, which, like the dodder, originates in the earth, is the Broom rape (*Orobánche*). One species of this nourishes itself chiefly upon the furze and broom; while another species (*Orobánche minor*) even draws its subsistence from the little clover-plant (*Trifólium pratense*); its roots after a time dying away in the earth. During the hottest months in summer, it may be found growing very plentifully in some clover fields, its yellowish brown flower connecting itself closely with the clover. This plant is named from a word signifying to strangle, owing to the opinion that it often destroys the plant to which it clings. The large species of this parasite is not uncommon on our heaths, and is of a hairy nature, with flowers of a dingy purplish colour.

Plants parasitic upon roots are remarkable for the smallness of their leaves, or for their entire absence, and for their stems never possessing a green colour. Both the last-named plants, originating upon the roots of others, are entirely destitute of foliage.

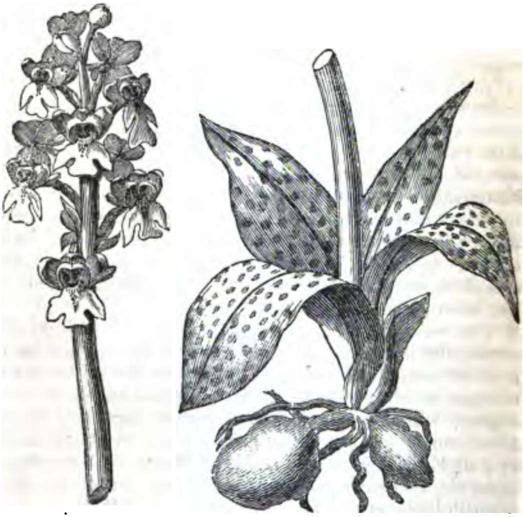
It will, I doubt not, greatly surprise you to find that plants so small as the clover should afford supplies of sustenance to others; and I hope it will interest you sufficiently to induce you to examine some of the clover plants with which you may meet in your future walks.

The plants which I have lately mentioned are the only ones indigenous to Britain, that can, strictly speaking, be called parasites; so that you will perceive that our parasitic plants are few, and, with the exception of the misletoe, of an inconspicuous character.

The climbing flowers that adorn our hedge-banks, winding their graceful stems around those of less flexible plants, as the bryony, the large white convolvulus, and the sweet-scented honey-suckles, do not derive any nourishment from others, but only recline their weakness upon the strength of those which can better resist the elements; as some timid maiden leans upon the manly arm of her brother, when the rude winds would threaten to overpower her more delicate form. Our climbing plants are generally very beautiful, but they can convey to us little idea of the immense creepers that entwine their stems around the trees of tropical climates, giving a feature of richness and profuseness of vegetation whose effect upon the traveller, unused to such scenes, is quite overpowering.

Perhaps in seeking for the parasitic plant, you may cast your eye upon the graceful fern, whose large leaves, placed upon a stem which bears no blossoms, have upon their under-surfaces the parts of fructification, and which are growing upon some aged oak: or you may glance upon the small and beautiful moss, which covers the stem of many trees of the wood, sheltering them from the frosts of winter and the heat of summer, and suppose that these two are parasites. These, however, are called false parasites, or epiphytes; and they will grow either upon dead or living vegetables, needing not for their sustenance the juices of another plant. You may often see these and other plants of a similar nature flourishing in all their beauty and greenness on the decayed surfaces of dead trees, or on the rock almost destitute of soil, but absorbing moisture for their nutriment from the surrounding atmosphere.

The beautiful class of Orchis flowers, some of which, termed by botanists *Ophryses*, present the appearance of a plant upon which the bee, the fly, or the butterfly has drooped awhile its wing to taste its sweets; and some others, which in their more common varieties, as the Orchis mascula, may be found in summer in almost every spot of English woodland, are in the torrid zone epiphytes upon the barks of trees, and constitute one of the most beautiful objects of tropical vegetation. With us they grow only on the earth, and they are far less splendid in appearance. Our English species of Ophrys plants, or plants resembling insects, will grow only on chalky soils. They are especially numerous upon the chalky range of hills that spread over a great part of Kent; but they rarely, or perhaps never, long survive transplanting to a garden. We have four species of this plant. The one whose resemblance to an insect is the most striking is the Bee Ophrys (*O'phrys apífera*), which might indeed easily lead the unpractised observer into the belief that it was a bee resting upon the stem of a flower. In South America the species are very numerous. One resembles the mosquito, another the butterfly; and the wanderer among the moist woods is often startled by the appearance of a lizard which one of these plants presents.



Salep—*Orchis mascula.*

LETTER V.

Roots—Parts of Roots—Uses of Roots—Couch Grass—Adaptation of Roots to Soils—Sea-side Grasses—Riband Grass —Upright Sea-lyme Grass—Fox-tail Grass—Incursions of Sand—Difference of Soils—Plants of the Mountain—Plants of the Valley—Locality of some Plants—Crocus—Pæony—Variations in colours of Flowers—Milk Vetch—Hibiscus Mutabilis—Shoe Flower—Plants of Torrid Zone —Tree Ferns—Plants of Africa—Plants of America—Plants of Cold Climates—Love of Home—Lines on the Violet.

THE roots of many plants are useful for medicinal purposes; and the daily appearance at our tables of the potato, the turnip, the radish, or others, may render it unnecessary for me to point out their importance as vegetable food. A description of their different kinds could not fail to be interesting; but it would be impossible to convey any adequate idea of their various forms, or the peculiar advantages resulting to the plants from their respective structures, without exceeding the limits of a work of this description, and using terms which you are not prepared to understand. It may not be amiss to state, that seven kinds of roots are generally enumerated by botanists, and to recommend a careful examination of this part of the plant, should you feel sufficiently interested to induce you to pursue farther the study of the vegetable kingdom.

Roots consist of two parts, the body and the fibre; but the latter only is absolutely necessary, as its use is to imbibe the nourishment requisite for the plant, which it sucks up at its extremities. As soon as the seed commences germinating, it becomes swelled by warmth and moisture; when bursting its covering, it sends out its root in a downward direction, guided by that attraction which impels it toward the centre, and seeking that darkness which seems necessary for the full action of its fibres. By a law equally invariable, the stem rises in an opposite direction, seeking the light.

Naturalists have not been hitherto successful in accounting satisfactorily for these opposite directions of the root and the stem; and the law by which the latter is governed yet remains to be discovered by future experiments. Undoubtedly it is wisely ordained by Him who made the plant; but as the great Creator of all works apparently by means in all the operations of nature, and governs the universe by undeviating laws, it is highly proper that we should endeavour to ascertain what these methods are, assured that the result of every discovery will give evidence of the wisdom which applies appropriate means to a worthy end.

As it is by the fibre that nourishment is absorbed, it must be evident that the greater number of fibres a root possesses, the larger will be the portion of sustenance which it extracts from the earth. The fibres have also a tendency towards any portion of soil especially favourable for them, always creeping towards any part which, either by moisture, heat, or any other circumstance, is likely to promote their nourishment.

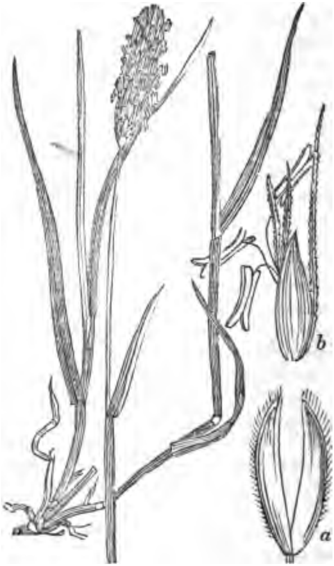
"When a tree which requires much moisture," says Mr. Knight, "has sprung up or been planted in a dry soil in the vicinity of water, it has been observed that much the larger portion of its roots has been directed towards the water; and that when a tree of a different species, and which requires a dry soil, has been planted in a similar situation, it has appeared, in the direction given to its roots, to have avoided the water and moist soil."

Some roots are very deleterious, as those of the different kinds of nightshade; and many, like the buttercup (*Ranúnculus ácris*), have acrid qualities which will cause vomiting. Even the potato, that useful vegetable, contains a portion of poison, though it is rendered less by boiling, and does not exist in sufficient quality to make the vegetable pernicious.

Besides their office in supplying the plants with nourishment drawn in from the soil, roots serve to fix them more firmly in the earth. The roots of many of our fruit trees are very large, and extend to a considerable depth in the earth; besides that their fibres generally spread to a space beyond that occupied by their foliage. The zigzag form of many roots is often occasioned by their meeting in their progress with stones or other hard substances, when they will curve round and extend in another direction. The roots of some plants are, however, so strong that they will pierce through materials which would appear sufficiently hard to repel their delicate fibres. The couch grass (*Tríticum répens*) will send its roots through a potato, and is besides of such a nature that if a portion of its roots be broken off, the vitality of the remainder will not be destroyed, but will produce a new plant. This tenacity of life renders it a most troublesome weed to the agriculturist; yet in former times, when famine sometimes prevailed to a distressing extent in England, our forefathers were glad to obtain a supply of bread from the flour-like substance contained in the root of this grass.

The wisdom of God in the adaptation of the forms of roots to the situations in which they are designed to flourish is in many cases no less obvious and remarkable than that evinced by him in the dispersion of the seeds. Those grasses which are to be found by the sea-shore have roots which creep to a great distance; and these prove of much service in binding down the loose sand, and in securing the river banks from the encroachment of the waters. This may be seen in the *Phálaris arundinácea*, or Riband grass; a plant sometimes cultivated in our gardens, but which exhibits the peculiarity of its creeping and tufted roots only when growing wild on its native spot—the margin of the river. This grass is common during the summer on most of the borders of the lakes and rivers of England, mingling with the numerous lovely and bright flowers which cast their delicate petals upon the meandering streams, or cluster in rich beauty beneath the shade of the mournful willow, softly blooming there as if in kindly sympathy with its pensiveness.

Another grass, the upright sea-lyme grass (*E'lymus arenária)*, affords by its creeping root a great support to our sandy loose shores, and is of so essential service to the coasts of Holland by binding them together, that were it not for the protection of this little plant that country would in all probability be inundated by the advancement of the ocean: a fact of which the industrious people of Holland are so well aware, that they carefully cultivate the grass. Its root often extends to the distance of some



The Meadow Fox-tail Grass.
a, glumes, and *b*, palea, of the flower.

yards, and when the grass exists in great quantities the whole soil is covered with the network formed by its fibres.

The grass called Cat's-tail grass (*Phléum praténse*), the Fox-tail grass (*Alopecúrus geniculatus*), and some others, when they grow in pastures watered by neighbouring streams or rivers, have a fibrous root; because this is sufficient to furnish them in such situations with a regular supply of water: but when they grow in dry places, or in such as are only occasionally damp, their roots assume a bulbous form, which, being adapted to contain within itself a portion of moisture, enables the plant to resist drought.

In the vast sandy deserts of Africa, where there are few trees except those of the Thorn acacia, and the Date palm, which flourish most in sandy regions, and where there are few grasses or other small plants to bind down by their fibres the loose sands, these are sometimes raised by the wind in a most fearful manner, destroying whole herds of cattle and parties of unfortunate travellers who may be exposed unsheltered to their overwhelming power. Even in some parts of Africa where the sand-storms are not of this appalling character, the quantity of loose sand ever floating upon the air has so great an effect upon the inhabitants in their neighbourhoods that their eyes are frequently in a state of inflammation, and many incurable complaints of the eye are induced by it.

Our own island is not always free from incursions of sand; and many instances are recorded in which it has desolated valuable estates. The estate of Coubin, near the town of Forres, in Elgin, which has been, within the last century, of great value to its possessor, is now so inundated by the flowing in of sands, raised by high winds, as to be almost wholly unproductive. This injury to the estate was incurred by cutting down some trees, and rooting up the grass which grew upon the neighbouring sand-hills, when their loose soil was borne away upon the elements. One single plant of the lyme-grass will fix the sand and collect it into a small mound; and, by a providential arrangement, demanding our gratitude and admiration, a grass so valuable to man is reserved for his especial service, by being rendered so uninviting to cattle as that none will feed upon it.

Who, as he considers these kind provisions of Nature, will deny the providential care of Him who causeth the herb to grow for the service of man, and nourisheth and cherisheth every green thing? "How do you know," inquired a traveller of a poor wandering, untaught Arab of the waste, "that there is a God?" "In the same manner," he replied, "that I know by the prints of feet in the sand, whether a man or a beast has gone over this path."

The root is the part most important to the plant, as, should that be destroyed, the death of the whole plant is in most cases inevitable; while, although every other part should be injured, it may not perish should the root remain. Most of us have, during our childhood, gathered bright blossoms from the roots, and stuck them by their stalks in the ground, delighting ourselves with a garden which the morning sun was shortly to wither, or the evening damp to lay low for ever: as often a warm and beautiful but transient emotion, which, not being fixed in the heart as a principle, fades away beneath the withering influence of ridicule and opposition, or slowly declines in the chilling atmosphere of the world.

Roots are either annual, biennial, or perennial. They are called annual when the plant dies at the end of the season, and is reproduced in the succeeding one by its seed; these generally consist of fibres or bulbs, as the barley and the tulip: they are biennial when, having furnished the plant of one year, they lie dormant during the winter months, and are produced again during another summer, as the fox-glove; and perennial when the root serves the plant for many years, as the field-convolvulus, and many other meadow flowers, as well as the various kinds of trees and shrubs.

The adaptation of the form of the root to the soil which it inhabits affords many useful hints to the agriculturist and botanist. An examination of its structure will sometimes determine the former as to the kind of land on which the plant may be successfully cultivated; while to the latter it will afford some indication as to the places in which he is likely to find it growing wild. Roots that are of a strong nature, and that possess a considerable degree of substance, seem to require a dry soil; while boggy land is favourable to the willow, which often so gracefully overhangs our streams. The Lombardy poplar, which borders the streams of Lombardy, its tall form raising itself above the alders and willows near it, will flourish on none but clayey ground. Plants whose roots consist of a great number of very small slender fibres, as those of the various kinds of heath, which group in beauty upon our heath lands, or those which, displaying their brilliant colours in the conservatory, are the produce of the Cape of Good Hope, need a fine soil with a slight degree of moisture, as their roots are too delicate to penetrate a stiff soil, or to overcome the resistance offered by earth clogged with a considerable portion of damp.

I may give you, as a general rule, a direction to seek for a plant on a soil similar to that on which you may have known it to grow in any previous instance. I am not here supposing you to be a geologist; for, however valuable an acquisition would be an acquaintance with the science of geology, a little observation will be sufficient to enable you to determine any of the most obvious characters of soils. You can easily distinguish a dry earth from one watered by rivulets; or the sandy soil adjoining the sea, from the chalky land which forms the surface of the towering cliff in its vicinity.

The character of vegetation varies greatly in different situations; but you will find that under the same latitudes the same kinds of plants which inhabit one valley or mountain, exist in other spots of the same description; and that the borders of rivers, the marshes, and the arid rocky districts, present in their respective vègetable productions a very similar aspect, though a hundred miles may separate them.

The variation of a plant, according to its degree of elevation on a mountain, may be seen by comparing one of the same species that has been found in the valley, with specimens of those that grow on different parts of the ascent, when they will be found so various in appearance that any one unacquainted with the fact would suppose them to be entirely different species of plants.

The valley, the midland part of the mountain, and the land near the summit, are also clothed with different kinds of plants, until the top of the mountain is found to be covered with the snows, which, with the exception of mosses and lichens, exclude all traces of the vegetable kingdom. The air of any elevated region becomes colder and drier during the ascent; and both these circumstances affect the nature of plants. Barton tells us that mountainous countries, owing to their differences of soil and climate, present a most interesting field of observation both to the botanist and geologist. "Even the unscientific traveller is struck both with the beauty and novelty of the flowers which he finds at every step on crossing the Alps or the Pyrenees."

In searching for flowers upon a soil whose nature would lead you to expect that they might probably inhabit it, you should carefully remark any local circumstance; as the absence or presence of trees or underwood, or the neighbourhood of a cultivated field or garden. Some plants seem so to follow man, that they may be found only in places contiguous to towns and villages; and I must here caution you, lest you meet with some disappointment, that even when you have fully considered all circumstances, you will not in every case find the plant upon the spot in which it might be expected to grow. Future attainments of botanical science may perhaps enable us to account for the prevalence of several plants in particular spots when the adjoining land is quite destitute of them. I am acquainted with a species of wild sage (*Sálvia praténsis*), which is rather a rare plant, and which has been found on a hedge-bank on one corner of a field, while the surrounding district has been searched for it in vain.

Few, indeed, are the counties of England which can exhibit the floral beauty of fields coverred with golden and purple crocuses (*Crócus satívus*, and *Crócus vérnus*). These Mrs. Howitt describes with much of poetry, as affording to the children in the neighbourhood of Nottingham a treasure quite as plentiful as the little ones of other counties realise in the spring daisy or gay buttercup; and sympathising, as the kind heart can, with the joys of the youngest infant, she exults in them as delightedly as if she, too, had none of the cares which womanhood must bring. Well is it for us when, forgetting all selfish thoughts, we can find enjoyment in the joys of others. Oh! never, never think that happiness is to be found in selfishness!

The Pæony (*Pæónia corallína*) flaunts its gay beauties on scarcely any other spot of English ground than on the island called Steep Holmes, which stands amidst the Severn: but I will not multiply instances familiar to all acquainted with the flowers of our country.

The manner and degree in which soil and atmosphere affect the plant subject to their influences, is a topic on which naturalists are much divided in their opinion. Sharon Turner remarks, "That plants with few and small leaves depend chiefly on the soil; those with many and large ones, more on the atmosphere." It is a very singular fact, and as yet wholly unexplained, that flowers of different colours sometimes flourish on the same root. This may often be seen on the Marvel of Peru, and the Sweet William of our gardens; both of which bear coloured and white flowers upon the same root. The common Ling (*Callúna vulgáris*) has been known to bear blossoms which on one branch were white, and on the other of the usual colour. These were two stems of "the same root, exposed to the same light and shade, draught and moisture, as all the other ling which grew plentifully on the heath around it."

Plants, whose colour is deemed so constant as to have become proverbial, are sometimes found of a different hue; as is the case with the blue harebell, so often alluded to in poetry as descriptive of the eye of some gentle maiden. This is the *Campánula rotundifólia*, whose blossoms are sometimes found of a beautiful white colour —whose flower cannot fail, under every variety, to please us, as an image of humility and gentleness—and whose elegance of form is perhaps not exceeded by any flower of the field.

The common Milk vetch (*Poly'gala vulgáris*) is a pretty flower frequent on hilly pastures, with long slender leaves, and blossoms that grow upon the stem about to its middle. These are of a purple, blue, pink, or white colour. I have often seen them gradually turning from the deep blue to a pale tint. At first the blue becomes of a lighter colour; then it assumes a whitish cast; afterwards it turns either to a clear white or to a white tinged with blue.

Although this change in the colour of flowers cannot be fully explained, yet we know some of the laws by which it is influenced. Blue flowers will turn to white or red, but never to yellow; and a bright yellow flower will sometimes become white, but is never known to vary to blue.

Miss Roberts, in her 'Characteristics of India,' describes a remarkable change in a beautiful inhabitant of Hindostan. "The flowers of a tree of no mean growth arrive to nearly the size of a pæony; these flowers blow in the morning, and appear of the purest white, gradually changing to every shade of red; until, as the evening advances, they become of a deep crimson, and falling off at night are renewed in their bridal attire the following day. When gathered and placed in a vase they exhibit the same metamorphosis; and it is the amusement of many hours to watch the progress of the first faint tinge as it deepens into darker and darker hues."

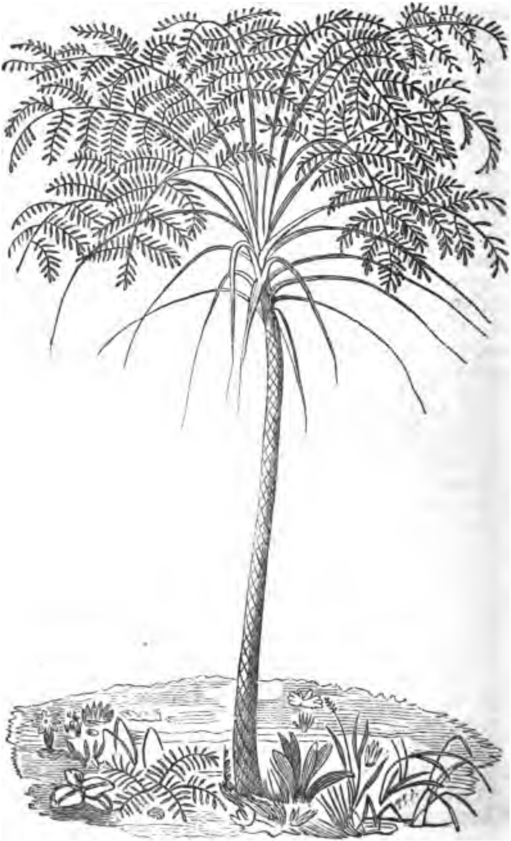
Miss Roberts has not given us the name of this flower, but it is probably the *Hibíscus mutabílis*, as it answers her description. Another species of this flower, the *Hibíscus rósa Chinénsis*, is called, by the people of Singapore, the shoe-flower. The beautiful petals of this flower contain a great quantity of black juice, and when rubbed over the shoes it imparts a lustre and blackness to them unrivalled by the English composition. It has, too, the peculiar advantage of not soiling the dress of the wearer, and is on this account much used for the shoes of the European ladies resident at Singapore.

It is not uncommon for the blossoms of our wild plants, which are usually of a red or blue colour, to become white by removal into a garden, but if taken back to their original soil, gradually to resume their former hue.

Some plants upon removal will die unless the situation in which they are placed be very similar to the one which they have left; others more easily accommodate themselves to the change; but cultivation has always some effect upon a plant. The most common one is that of rendering its flower double; but in many instances the hairs and prickles which belong to the wild plant quite disappear under the hand of the gardener; and the plant becomes so altered in structure and appearance as to bear but a faint resemblance to the wild specimen.

The plants belonging to tropical regions not only flower during longer seasons, but are larger and more numerous than ours, and decked with colours with whose brilliance our most glowing blossoms cannot vie. Our hothouses may convince us of this; but cultivation must have so changed them that we cannot from the flowers of the conservatory form an idea of the appearance they present in their native lands.

The bright colours of the flowers of tropical climates strike every traveller with surprise and delight. In many parts of Hindostan a flower is very common, called by the natives flame-flower (*Ixóra*), the blossoms of a shrub about six feet high, and whose scarlet clusters are so bright as to resemble burning coals. The vegetable productions of the countries between the tropics vary in the eastern and western hemispheres, and are also much affected by the number of mountains, lakes, rivers, and other circumstances of the landscape. The most characteristic feature of tropical vegetation consists in the numerous species of palms. You have read too many descriptions of these, and seen too many pictures of scenes of which they formed a prominent part, not to have



Tree Fern.

some general idea of their appearance. They have tall, slender, and branchless stems, whose summits are crowned with long leaves that float gracefully before the breeze: in some species bending down, so as to have suggested to more than one poet the idea of an elegant woman with her head languidly reclining as if overcome with sleep.

The plantains, too, flourish between the tropics in many varieties; and the ferns, which with us are not large plants, are there of the size of trees. I shall give you an account of these plants from the pen of Barton. "The ferns are distinguished by producing their fructification on the back of the leaf, generally in the form of brown spots or stripes, instead of bearing flowers like other plants. We have in England about forty species, none of which exceed three or four feet in height; whereas in the torrid zone they attain the height of twenty and thirty feet. Of all the forms of tropical vegetation, these and the bamboos, according to Humboldt, most excite the attention and awaken the admiration of the traveller. In their general aspect the tree ferns considerably resemble the palms. Their stems are generally black, as if burnt by the heat of the sun; their leaves of a bright and delicate green, beautifully crisped at the edge. It has been observed of the ferns, that they principally delight in inland situations: few, comparatively, are found in the interior of large continents, owing perhaps to the want of a due portion of moisture. They abound amongst the dripping springs that ooze from the crevices of rocks; and some species of exquisite beauty are found lining the sides and roofs of the little caverns which contain the sources of natural fountains. Ferns are very numerous in Jamaica, in New Zealand, in Otaheite, and in St. Helena. In this last island they constitute a large proportion of the whole number of native plants."

The *Pteris excelsa*, a very beautiful fern of the Sandwich Islands, is, in its tender and delicate parts, accounted a great luxury by the natives, who eat it without any preparation.

Tree ferns are peculiar to the tropics; the smaller ferns are, however, found in the temperate zones, and some few grow in the countries bordering the arctic circle. A fern which you well know, the common pteris or brake, often covers our heath ground, affording a favourite resting-place to the tired deer. In the cherry counties the large leaves are much used in packing cherries to be sent to a distance, and it is of service in the preparation of some kinds of leather.

The character of the soil of Africa, consisting of a great quantity of sand, gives its peculiarity to the vegetation of that country. In the countries lying in the torrid zone, however, many plants are very similar. In all tropical countries the different species of palm appear; the plantain gives its welcome shade; the tamarind tree and the light and elegant tree-fern may be found; while, added to these, in Africa the gigantic baobab affords a wide and pleasant canopy to shield the inhabitants from a burning sun. Throughout Africa large tracts of sand prevail, where not even a blade of grass is to be found, and where scarcely a tree is to be seen except occasionally the Thorny acacia (*Acácia capiénsis*), which is about twenty feet in height, and its foliage so fine leaved as that it scarcely affords any shelter from the sun. The wilds of the lone Karroo, a large sandy desert, are varied by clumps of this tree, whose boughs bear thorns of four or five inches in length; and whose beautiful and verdant foliage affords a most pleasing relief to the wearied eye of the traveller.

Other parts, still sandy, but less barren, are clothed with beautiful heaths (*erica*), which form a grand feature of African vegetation, and not one of which is to be found in America. Some of these are of extreme beauty, with white paper-like flowers or blossoms with every variety of rose-colour, and stems often six feet in height. The dais displays there its golden blossoms. The various species of lily-like amaryllis exist in profusion; the geranium exhibits its rich colours, and numbers of the most lovely flowers, those especially of a radiated kind, as the marigold, flourish on soils which would seem calculated only for a solitary waste.

The forests of Africa are not numerous. Instead of the abundance of magnificent trees presented by the countries of the western hemisphere, the trees of Africa are comparatively few. Even where a long line of wood extends over the surface of the country, the trees are frequently of a small kind, and are remarkable for their slender leaves, scarcely any being found in regions without the tropics with an umbrageous or dense foliage.

Great numbers of bushes overspread Africa, and these are very unlike the bushes of Europe, resembling in their form and woody nature very low trees. The bush country is covered with a great number of succulent plants, most of which are clothed with immense thorns or possess a poisonous juice.

The hedges of the gardens in the neighbourhood of the Cape of Good Hope are made of myrtle, and are often twenty feet high. Their soft green leaves mingle with those of the orange-tree, upon whose boughs hang at once the rich golden fruit and the fair clusters of flowers "like age at play with infancy;" and the lemon-tree sends forth its sweet odour upon the gale. Then there are the different species of protea. The *Protea argentea*, whose leaves, soft and glossy as satin, are coloured like silver; while its neighbour, the golden protea, displays a foliage of a yellowish green colour edged with scarlet, which floats in the air like waves of flame.

Trees whose leaves are evergreen abound in all equatorial countries, and many tall and rigid grasses, as the bamboo, the sugar-cane, and others of less magnitude, vary the scene with their brilliant and numerous flowers. The western hemisphere, however, exhibits the most glowing colours, both in the tints of its flowers and the plumage of its birds. The vegetation of that part of America situated between the tropics is of a character truly gigantic. Immense forests filled with lofty trees, upon some of which hang leaves of which one is large enough to cover the roof of a cottage, and so thickly interwoven as that the traveller may wander among them for miles without even feeling the sun's rays, except when a fallen tree makes an opening for their admission.

The foliage is of a most lovely green or a rich purple colour; and the trees are overhung with large creeping plants, some of them bearing clusters of bright scarlet blossoms, which give the tree the appearance of being decked with garlands of flowers. At night they are bespangled with the fire-flies, which abound in tropical countries, whose light, of the same beautiful emerald green as that of our English glowworm, exceeds it far in brilliancy; its little lamp enabling the traveller to read by its shining.

A creeping plant grows in the forests of Demerara, whose stem, as thick as a man's body, winds around the trees with numerous turnings, sometimes rearing itself above their most elevated branches. These immense stems are often interwoven among the trees, and binding them together enable them to offer a strong resistance to the winds. This creeper is called the bush vine, because it is used by the wood-cutter in removing out of the woods the heavy timber which he has laid low. Sometimes a tree above a hundred feet high is, by one of those tremendous whirlwinds so frequent in those countries, torn up by its roots; but cannot reach the ground, being supported in the air by these large vines. In other parts of these regions there are districts consisting of two thousand acres, covered with thick and high grass, through whose vast solitudes no road has ever been trodden by the foot of man.

Vegetation has little of this brilliant character in regions near the poles. I have already mentioned some of the beautiful berries that adorn the trees of northern climates amid their snows. Large forests are found in some of the countries of Europe and Asia, bordering the arctic circle, in which the different kinds of pines and firs, the birch, the alder, the aspen, the hazel, and the willow flourish abundantly. Pines and firs will grow in almost all countries or spots where the atmosphere is cold, and may be found even between the tropics on elevated situations; while the willow grows from the tropics to those countries where trees entirely disappear. Trees similar in character, but fewer in number, are found on the borders of the arctic regions of America.

Approaching the poles, trees become comparatively rare, and grasses, mosses, lichens, and other small plants appear. Mosses, indeed, exist under every variety of climate; but it is in cold countries that they are most abundant. In some of the northern parts of Russia, the mossy carpet is so thick as to reach the height of a man's knee, and it extends over a vast surface of country. Mosses are extremely beautiful, and in many species so tenacious of life that if exposed again to moisture after having been long dried, they regain their health and freshness. The Iceland moss, on which the valuable rein-deer feed, and which boiled to a jelly is so useful to the invalid, grows very near the regions of perpetual ice and snow.

Mosses, besides their great beauty, are useful in preserving the roots of trees from the cold during winter, and shielding them also from the heat of summer. In China, the poor, to whom, as well as to the rich, tea seems a beverage indispensable for their comfort, make their common tea of a species of moss; and it is said that this moss is sometimes mingled with the article brought to England as the leaf of the tea tree.

Perhaps nowhere are mosses more beautiful than in some countries approaching the southern arctic circle. They are described as very abundant at Staten Island, in the southern ocean, and in the countries and islands about Cape Horn. At Cape Horn also the bright fuchsia lifts its head above the snows which the storm has scattered around it, and the orchises and yellow Magellan violet bloom there in more favourable seasons under the shadow of the wild currant tree and the evergreen beech.

Plants accustomed to the seasons of their native climate do not easily change their habits and conform to those of another. It was observed by a pupil of Linnæus that apple-trees sent from Britain to New England blossom at first too early for the climate, and bear no fruit. Roots and seeds when brought to us from more southern latitudes, will often grow and appear to thrive as well as if under the influence of a tropical sun, but will bear no fruit for many years: or if their fruits appear they are few and diminutive, and will not ripen. Many plants of Africa, Asia, or the West Indies will never produce fruit in Great Britain, although our climate does not prevent their flowering.

When we read descriptions of other countries, written by those who are capable of picturing the appearances presented by their vegetation, we feel eager to follow the steps of the traveller who tells us of so much that is new and beautiful. We long to rest our eyes on the sublime scenes beheld from the lofty mountain, or to linger with him among the sweet seclusions of the valley at its foot. We think that could we behold flowers so brilliant and trees so magnificent as those which the sunny regions near the equator exhibit, our love of nature would be increased and strengthened; and indeed it might be so, for none ought to love the scenes of nature—the works of God—better than they who have lived most among them, who are acquainted with their every aspect; whom the wild and rugged portions of the landscape have filled with awe, or who have gazed with calm delight upon the soft and verdant glen. How much more if, while looking upon them, they can say with the poet, "My Father made them all!"

I should not envy the person in whom descriptions of natural beauty could awaken no feeling—no longing of this kind. I do not wish to check your imagination when it takes this direction. But are there not beauties around you? We too have interchange of hill and valley—of field and wood. Shall we look carelessly on our own wild rose-tree, whose bloom is delicate as the blush of feeling, and whose perfume, mingled with the scent of the bean-flower that blossoms near, breathes sweetness; and, as says Lord Bacon, "the breath of flowers is far sweeter upon the air, where it comes and goes like the warbling of music, than in the hand"? Shall we forget our lovely banks of primroses and sweet and modest violets? Have we not in our own woods the fair lily of the valley, which, enwrapped in her green mantle, is bending her delicate blossoms to the earth, presenting to our fancy an image of humility, or of that soft pensiveness which the mind feels when comparing what it is with what it would be?

Oh! there are thousands of beauties around your own dwelling, from the small moss and the elegant flower of the garden saxifrage or London pride, to the magnificent beechen-tree that rises upon the summit of the neighbouring hill, which has borne the winds and storms of many years, and yet stands in strength and beauty. These have all one charm, which I trust will never lose its influence; they grow around your home. Everything that reminds us of home—of the friends who have loved us long and will love us till we die—may one day seem to us to possess a beauty as yet unthought of; and the day may come when, far from the scenes of your youth, you may fondly ask, Are the wild flowers yet blooming there? Yes, the time may arrive when the sight of an English daisy shall bring the tear of regret upon your cheek; and the reminiscences of early days awakened by the wild floweret may draw from your bosom a sigh for the happy island where your early lot was cast.

THE VIOLET.

The violet, the violet, oh! we have loved it well,
And sought for it in early days in many a pleasant dell;
And when the wintry winds were still, and the April sky was fair,
We wander'd forth 'mid woods and lanes breathing the scented air;
Though many a woodland flower we loved,—and, ah! we love them yet,—
The violet we loved the best—the fragrant violet.

There's not a flower that early blows but to our hearts might bring
Sweet memories of vernal scenes, or of our life's young spring;

But most we loved the violet; we deemed the white ones rarest;
And long and eagerly we sought the largest and the fairest;
And when we found it 'midst its leaves, ah, I remember yet
The shouts of joy that ever hailed the first white violet.

We lost our friends amid the woods, and loudly called each name,
Till almost breathless with delight they quickly running came;
And we sat down beneath a tree our treasures to unfold,
The anemone, and primrose, and celandine of gold;
But still we earliest learnt to prize, and latest shall forget,
The sweetest flower that decks the wood—the modest violet.

I bid thee note each flower that blooms, and every waving tree,
I bid thee watch the butterfly, and mark the honey-bee;
They each can tell a tale of love—a tale of Him whose power
Form'd every joyous living thing, and every beauteous flower;
But, for past days and early friends, I bid thee cherish yet
The flower so fair to childhood's eye—the lovely violet.

LETTER VI.

Early Morning Walk—Anemone—Lily of the Valley—Snow-drops—Sweet Woodruff—Melilot—Hay-field—Melancholy Flowers—Flowers of Ceylon—Lime Tree—Scent of Tropical Flowers—Flowers on the Senegal—Fondness for the Rose in Eastern Countries—Love of Perfumes—Mound of Roses in Persia—Rose Gardens—Betel Leaf—Balm of Gilead—Use of Perfumes among the Ancient Hebrews—Among the Greeks and Romans—Fragrance of bruised Plants—Uses of Fragrance—Carrion Flowers—Water Dropwort—Poison Ash—Existence of Poison no Argument against the Benevolence of God—Uses of Flowers in the East as expressions of Feeling—Gardens of the East—Uses of Flowers among the Greeks and Romans—Uses of Flowers in Cemeteries—Allusions to Flowers in Poetry.

I hope you are fond of early rising. I believe all Nature's children will allow that never are her scenes more beautiful than at the period of "reviving day," though all may not possess sufficient strength of body or energy of mind to induce them to relinquish their slumbers and wander abroad to behold her charms. How freshly the wind fans the cheek in an early morning walk, seeming to bear health on its breezes! How beautiful are the dew-drops scattered like pearls upon the leaves and flowers! How melodious the song of the up-rising lark, and how cheerful the active step of the countryman who is bending his way to the field! "Man goeth forth to his labour and to his work till the evening."

When we see the pale artisan of the crowded city enter beneath the roof where his daily occupation is to be pursued, we feel much of pity, as we think that in a close and confined room he is destined to be shut out from the bright sunshine and the exhilarating air of heaven; but the sight of the peasant at his cheerful employment awakens no such feeling. Labour such as his seems to be a blessing to him who is engaged in it; placing him in scenes where all that is fair is around him, and affording him that exercise so conducive to health and cheerfulness.

In early morning many of the flowers are yet sleeping, but some there are which expand then, and then only. Nor can we any more ascertain why some blossoms should revel in the sun-beams and others shrink from them, than we can explain the circumstance of their flowering in their respective seasons of the year. Why does the wood-anemone wait for the warm day of spring before it opens its delicate blossoms, and the lily of the valley flourish only in the warmer air of summer; while the snow-drop, equally fair and delicate in appearance, blooms amid the cold of winter or very early spring? You may have beheld the fragile snow-drop blossoming on some elevated spot which was quite unsheltered, and daily watched it, fearing that some of the rough blasts which blew over it would break its stem, and scatter its petals upon the wind; yet it lasted far longer than many of the flowers of the summer. So I have seen a friendship formed in early life, which he who gazed upon might deem too frail a thing to survive trials that shortly must assail it, outlast the friendship whose commencement in later season and more vigorous form gave greater promise of endurance.

But perhaps one of the greatest charms of an early country walk is derived from the pleasant scent of the air. The honey-suckle, the field convolvulus, and the violet, diffuse a fragrance so soft and grateful that the most delicate nerves are refreshed. The ground newly turned up by the plough has a very pleasant smell in the morning; even the grass and the green leaves have the fresh spring-like scent, which though it scarcely amounts to perfume, yet has a very pleasing influence. Surely the sweet scents of spring and summer, and the elastic bounding of our untired spirits on a fine morning, speak of the kindness of God, and ought to inspire that cheerful and grateful emotion which is a welcome tribute of love and admiration to Him who designed them for our enjoyment.

Have you, when gathering the summer nosegay, ever bound among it a branch of the sweet woodruff (*Aspérula odoráta*)? If you are yet unacquainted with it, I would bid you seek it among the pleasant woods where it blooms very plentifully during the summer months, bearing on its stem crowns of leaves which in spring are of the most tender green. They grow all round the stalk in what is called a whorl, each whorl having eight leaflets; and they are thickly set with small hairs, both on their surfaces and round their edges. It is from its roughness that the plant derived its botanical name, the word asper signifying rough.

The whorled position of the leaves of this plant renders it very similar to the common cleavers (*gálium aparíne*); but its sweet scent sufficiently distinguishes it. It does not emit this fragrance while growing; and I remember once when, never having seen a specimen of this plant, I set out to search for it in the woods. I several times gathered it, but finding it to afford no odour I threw it away in disappointment, concluding that I had not rightly understood the description I had previously received. I fortunately carried one piece of it away with me, intending, upon reaching home, to examine it more minutely. The warmth of the hand soon brought forth its sweet properties, and in the course of a few hours the room in which it was placed was quite perfumed by it. The scent is very powerful, and will retain its strength for some years, imparting its sweetness to any object near it. The sweet woodruff especially prefers the neighbourhood of trees, and you will find it most readily rising up around the trunks of old oaks, in such a manner as to need but little imagination to enable you to fancy it a ruff about them. The mould on which it grows is sometimes formed almost entirely of the fallen and decayed foliage of these trees. The flowers are of a brilliant white, clustering in little stars in shape like the garden jessamine, at the top of a long stalk. The whole plant is about six inches high and extremely pretty, especially if seen through a magnifying glass. The plant is said to impart its flavour to vinous liquors; and its smell is reported to have the effect of driving away insects. There are two other species of woodruff, both very pretty little flowers, and similar to this in appearance, but both destitute of that peculiar fragrance which gives it its greatest charm.

Another plant diffusing a delightful odour while drying is the common melilot (*Melilótus officinalis*). This may be met with chiefly among bushes, and often flowers in the hedges at the sides of lanes and roads. The leaves are broader at the top than at the part nearest the stalk, and their edges slightly serrated (notched like a rose-leaf). The fragrance of this plant, though not quite so powerful as that of the sweet woodruff, is equally lasting; and when the sun, by absorbing its moisture, has withered its freshness, and it appears almost dead, this quality is in perfection.

But the most common instance of the sweet smell of dried plants is afforded by the hay-field. We walk into the pleasant meadows in spring, and are greeted by no perfume, except that smell of freshness which the green earth at all times yields; or, if there be a more powerful sweetness, it arises from some of the many-coloured flowers that are springing up around us, or from the blue violet or the fair hawthorn of the meadow-bank. But when the mower has cut down the grass, and the summer sun has dried its juices, then we experience that odour so grateful to the senses, which renders the hay-field peculiarly delightful, associated too, as it is in our minds, with the health and cheerfulness that so generally accompany the rustic labour of which it is the scene. The fragrance has been long supposed to arise solely from one species of grass, the vernal grass (*anthoxánthum odorátum*); and it has been long proved to exist especially in the joints of the stem, and not in the flower of this grass. The scent of the vernal grass is certainly, when dried, more powerful than that of any other; yet it is now generally believed that other grasses assist in composing the scent of the hay; since even when gathered and dried separately, many others yield a degree of perfume.

Some plants which grow both in the garden and hothouse, the natives of other climates, though growing in England, are quite scentless during the day, but breathe their sweetness on the dews of night. They were elegantly designated by Linnæus the *Flores tristes*, or melancholy flowers, because they are generally of a brown and dismal colour. Like the nightingale, which is silent during day and rejoices in the moonbeams, they want the lustre and brilliance of the gay children of the sun.

Some plants exhale their sweets chiefly on the air of evening. In the island of Ceylon, where the flowering trees and shrubs are beautiful, and where the blossoms among the verdure are so plentiful as that the trees are said to stand upon a carpet of flowers, the scent of them at early morning and in the dews of evening is far more powerful than can be conceived by those accustomed only to the flowers of higher latitudes. The passengers of vessels approaching Ceylon can perceive these gales

> "that sigh along
> Beds of Oriental flowers"

long before they reach its shores.

The same effect of evening air, though in a far less degree, may be instanced in the scent emitted by the lime at the decline of day. The blossoms of the linden or lime-tree (*Tília Europæ'a*) are open during the summer months, "at dewy eve distilling odours." This tree, so well adapted for our city walks and gardens, because uninjured by the smoke and confined air of towns, is very frequently planted in such situations among us; but is on the Continent a far more general ornament to the public promenade, and in Switzerland it attains to an immense size. It is with us a large and beautiful tree, when covered with its foliage of a light and delicate green; but one sad disadvantage to its beauty is the

Lime Tree.

Lime-Blossoms.

early fall of its leaf. Sometimes as soon as the month of August, when we are scarcely looking for the indications of autumn, its fading branches remind us that the sweet summer is fast hastening away; and, as its leaf is the first to leave us, so it is the latest in spring to revisit the tree. Neither has its form, when divested of its foliage, that pleasing appearance of outline presented by some trees. The tall elm is picturesque even in winter; and the birch, whose small pensile boughs wave in the breath of the softest wind, seems hardly to need the aid of its green dress to render it ornamental to the landscape.

In Berlin in Prussia, the famous walk called the Linden is planted with the lime. The inhabitants hang nightingales in cages among the trees, that the ear as well as the other senses of the evening rambler may be regaled, and the close of a summer's day exhibits many a cheerful group reclining or walking under its odoriferous branches. The lime-blossoms are especially attractive to bees; and these trees, possessing in a great degree the power of purifying the surrounding air to a considerable distance, are thought to add much to the salubrity of the neighbourhood. The leaves are covered with a saccharine and clammy matter, from which, by repeated boilings, sugar has been obtained; and they are much used in France and Germany as a remedy in pulmonary complaints. The linden-tea seems to the Frenchman a never-doubted resource when affected with cold and cough; and its emollient nature renders it a very agreeable remedy. This tree is not a native of our country, but its frequent plantation has naturalised it amongst us. It was from the linden-tree that Linnæus derived his family name. This great naturalist bore in his own country the name of Carl Linné.

It was of the wood of this tree that Grinling Gibbons, the celebrated carver in the reign of Charles II., executed those beautiful carved ornaments that adorn so many of the public buildings erected at that time. Some of the most elegant of them adorn Trinity College, Cambridge. These graceful and light wreaths well deserve the praise bestowed on them by Horace Walpole. "There is no instance of a man before Gibbons who gave to wood the loose and airy lightness of flowers, and chained together the various productions of the elements with a free disorder natural to each species."

Notwithstanding the remarks which, in the former part of my letter, I made respecting the odours of dried plants, the instances I then adduced, and a few others, form rather exceptions to a general rule than a description of the usual habits of plants in this respect. The fragrance of most plants decreases as they lose their freshness; a circumstance which you cannot have failed to remark when you have gratified your taste by gathering a nosegay of wild flowers, which fade sooner than the double blossoms of the garden. The rose, the violet, and some others, will, it is true, retain a portion of their fragrance after withering; but it is far inferior in strength and sweetness to that of the newly-gathered flower.

The part from which the aroma proceeds is various in different plants. Most frequently it exists in the blooming corolla. It is thus with the honeysuckle, the hawthorn, and a thousand others. Sometimes it is found in the herbage, as the sweetbriar, the sweet woodruff, or the ground-ivy: and even occasionally in the root, as in the Avens (*Géum urbánem*). The latter is a plant flowering in our hedges in June. Its small yellow blossoms are shaped like those of the strawberry; but the plant does not, like the strawberry, creep over the ground, being about three or four inches in height. The root has a very pleasant fragrance, but the rest of the plant is scentless.

In tropical climates the perfumes emitted by plants are far stronger than in our own land; and, when Europeans first visit India, they are quite overpowered by the influences of many of them, especially of the large jessamines. The early fragrance of Eastern flowers is described as delicious, the "dews being quite impregnated with their odours, and rendering a morning walk delightful." The banks of the Senegal, in Africa, are full of trees bearing very large and handsome flowers, which diffuse a most exquisite odour; so powerful, however, are its effects, that after a time it produces headache, and to these flowers is imputed much of the sickness which attacked those who resided in the French settlement there.

The inhabitants of Oriental countries are generally very fond of flowers. All odoriferous plants are valued by them, but the rose is a peculiar favourite. The earthen jars used in Hindostan for holding water for drinking are often arranged in small rooms, with as much order as the milk-pans of our dairies; and upon the surface of each vessel is strewed a few rose-leaves; not enough to impart their flavour to the water, but designed to please the imagination by the idea they convey of coolness and delicious sweetness. The Persians, who on many occasions carry their water in leathern bottles, use rose-water in cleansing them, in order that its delicate flavour may linger in the bottles.

Group of rare, natural, and artificial varieties of the Rose.

The rich natives of Hindostan, whose habits are exceedingly luxurious, scatter over the floors of their houses in great profusion the cooling rose-water; and smoke their hookahs amidst its grateful perfume.

Perfumes are greatly in request in all Eastern nations. These perfumes are generally extracted from the sweet-smelling flowers so numerous in these climates; but some, as the myrrh and frankincense, are the resinous juices of trees. In the neighbourhoods of Lucknow, Ghâseepore, and Cashmere, in Hindostan, large plantations of roses are cultivated for the purpose of making attar of roses; and these delicious fields shed their influence on the surrounding air to a great distance. The rose which grows in these fields is the rose of Damascus, or Scripture rose of Sharon; but those who have visited rose-fields, with high anticipations of their beauty, have felt much disappointment at their appearance. The roses grow on very low shrubs, which are planted for the sake of convenience in a regular and formal manner; and, as the flowers themselves are much smaller than those which are the pride of the English parterre, they do not present a realization of those ideas which had been formed at a distance. Fields of roses are associated in our minds with beauty and poetry, yet they are generally thought by the British visitant to yield in beauty to the luxuriant hop-gardens of his own country.

The author of *Sketches in Persia* thus describes a breakfast that was given to himself and some other gentlemen in the vicinity of Shiraz. "We were surprised and delighted to find that we were to enjoy this meal upon a stack of roses. On this a carpet was laid, and we sat cross-legged like the natives. The stack, which was as large as a common one of hay in England, had been formed without much trouble, from the heaps or cocks of rose-leaves collected before they were sent into the city to be distilled. We were told our party was the first to whom such a compliment had been paid. Whether this was the case or not, our mound of roses, added to the fine climate, verdure, gardens, and clear rills, gave a character of singular luxuriance to the rural banquet." It was of

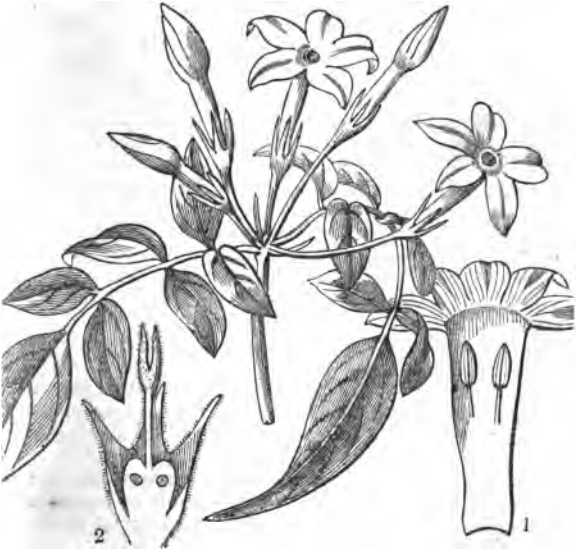
Rose of Sharon.

the beautiful Shiraz that Franclin said, its dew was so pure that, even should the brightest scimitar be left in the open air during the whole night, it would not be stained by a single spot of rust.

The Hindoo ladies perfume their apartments and their hair with the blossoms of the large flowering jessamine (*Michélia Champáca*), whose odour is extremely powerful; and the Chinese, Indians, Persians, Arabians, and Turks, anoint their bodies with a perfume made of the powdered wood of the sandal-tree (*Santalum*). This wood too is frequently burnt in their dwellings, and yields a most delicious fragrance.

The Chinese think that no offering can be so propitiatory to their deities as the sweet sandal-wood burnt upon their altars. At the seasons of some of their religious festivals, this wood is cut in small pieces, and sold in the streets in order to render it available to the poor.

The Indians of the Malabar Coast are in the habit of frequently chewing a leaf containing, in some of its species, an aromatic property. This is the leaf of the betel or pepper-vine, a plant which creeps up the betel or Areka-palm (*Areca Catechu*); and this, being sprinkled over



Jasminum Officinale.

1, Longitudinal section of the corolla; 2, longitudinal seection of the ovary and calyx.

with a composition of different ingredients, and having the Areka-nut folded within it to take off its bitterness, is eaten on many occasions. The Malabar Indian would be considered guilty of great presumption, who should dare to address a superior without having first perfumed his mouth by chewing a piece of betel-leaf; or of a great want of politeness, should he omit this ceremony with one in his own station. The practice of chewing this leaf prevails very generally among the natives throughout India; and when a visitor is about to depart, it is customary to hand it to him on a salver, the nut enveloped in the leaf, and fastened by a clove. It is thought by those who use it to improve the teeth; but it stains them black, and leaves upon the lips a stain of a bright orange colour.

The Areka-nut is sold in the bazaars and markets of Eastern countries. This nut contains so much heat that when a cargo is on board ship the part of the vessel where the nut is placed is forty degrees hotter than the deck. Arabia Felix, or Happy, is said to have derived its name from the number of odoriferous trees and shrubs it contains; and the Jewish historian, Josephus, mentions that, among the presents carried from Arabia by the Queen of Sheba to King Solomon at Jerusalem, one was the balm-plant spoken of in the Song of Solomon, as the balm of Gilead, from its having been subsequently cultivated on the mount of Gilead. This is still in request among Eastern ladies, on account of the balsam that flows from it, and which they use to improve the beauty of their complexions.

The ancient Hebrews, like the modern Asiatics, appear to have had a great fondness for perfumes; and the method of extracting them was evidently known by them long before it was known by the Romans. Their manner of composing them is not now known, but they were doubtless obtained from flowers containing the volatile oil in which the odour consists, or from trees yielding fragrant gums. In the time of their first great lawgiver, it appears that they were used in Egypt, since Moses speaks of the art of the perfumer; and prescribes the ingredients for two

Areca Catechu, with the Betel Nut.

odoriferous substances, of which one was to be offered on the golden altar, and the other used in anointing the high priest, the tabernacle, and holy vessels. The Hebrews anointed the bodies of their deceased friends, and in this process perfumes were largely employed, especially those of a more powerful kind, as aloes and myrrh; and we find that these were brought with sweet spices by Mary Magdalen, on the morning of the Resurrection, for the purpose of embalming the body of the Saviour.

Among the ancient Greeks and Romans, sweet odours were used at feasts, at their sacrifices to their many deities, and at their places of public amusement. It was customary to use them at funerals, both to counteract any unpleasant effluvia, and to gratify, as they supposed, the remains of the departed. They imported the nardus or spikenard from Syria, but some of their perfumes were obtained from animals, such as the civet. When we consider the great prevalence of this taste for perfumes among the Romans of other days, it seems singular that the people of modern Rome should hold them, however delicate they may be, in so much aversion, that they will not enter places ornamented with odoriferous flowers, nor endure the presence of any person who is scented.

Sir J. E. Smith tells us that a pope, having dreamed that a great quantity of snow had fallen upon a particular spot during the month of August, upon discovering that his dream had actually been realised, built in commemoration the Borghese Chapel at Rome, and directed that on the anniversary of the day a representation of a snow-shower should be given to the congregation throughout the service. The mimic snow was made of the lovely and fragrant flowers of the white jessamine, and the anticipation of their powerful odour deterred the ladies of Rome from honouring the ceremony with their attendance. Many persons in our own country are unable to bear the scent which delights others. Some will be affected with head-ache by the smell of the mignonnette, the hawthorn, or the lilac. A wreath made of the flowers of the garden laburnum, placed around the head, would in many persons cause extreme pain. Plants which are delightful in the field or garden, as the lily, will in the house affect the nerves of delicate persons. Large nosegays in confined rooms are generally considered to be injurious to health; especially during night, when they have a different effect upon the atmosphere than when acted upon by light.

The investigations of the chemist have proved that plants during day emit oxygen gas, which is indispensable to animal life; but that in the night they give out nitrogen, which is, on the contrary, of a most injurious tendency, as, if inhaled alone, it would inevitably cause instant death.

The fragrance yielded by some plants when bruised has afforded many beautiful images to poets. Moore alludes to this circumstance when speaking of the only real consolation in sorrow: he says—

"But Thou canst heal the broken heart,
Which, like the plants that throw
Their fragrance from the wounded part,
Breathes sweetness out of woe."

Travellers over the desert of Africa speak of an order of plants (*the Diosmas*) which when trodden upon emit an odour perceptible afar off. This property exists also in the spikenard-grass (*Nardus*), that affords the fragrance from which the ointment so often mentioned in Scripture derives its perfume. When an army rides over the plains of Persia, covered with this tall grass, an almost overpowering sweetness, arising from its stems and roots, fills the surrounding air. The ointment which takes its name from this grass was used among the rich Jews at their baths and public feasts; and the reproof regarding its waste, which was given by Simon to the affectionate Mary when she poured it over the Saviour's head, proves how precious it was then considered. Its value among the ancients may be inferred from the mention made by Horace, that the quantity contained in a small box of precious stone was regarded as equal in worth to a large vessel of wine. Perfumes are now but little used among us, being generally considered to injure the nerves. On some part of the Continent, in Spain especially, they are very general. The fragrance of plants is not only delightful to man, but it probably serves to attract bees to the flowers whence they are to gather honey. There are some kinds of fish that are so fascinated by the scent of sweet marjoram and some other plants, that, upon plunging into the water the hand that has been rubbed with them, the fish will come in numbers and suffer themselves to be taken. A similar effect is produced upon cats by the smell of the common valerian (*Valeriana rúbra*), which will rub their faces over this plant and seem as if they were intoxicated by it.

Warm climates not only present examples of flowers remarkable for their delicious odours, but they possess others whose scent is extremely offensive. Some kinds of Stapélia, an order of plants abounding in some parts of Africa, have the scent of putrefying flesh; and have, at a distance, the appearance of an animal substance, in colour resembling a toad. Others are scented like rotten cheese or stagnant water. The odour of one species of carrion flower (*Stapélia hirsúta*), is so powerful as to deceive insects into the belief that it is decayed flesh; and the flesh-fly often deposits its eggs upon the flower, following that instinct which induces it to place its eggs in a situation in which its young shall, as soon as they are hatched, be provided with nourishment. In consequence of this mistake, the young insects die almost as soon as produced, from not finding the supply of food necessary for their support.

A plant growing wild on the banks of our rivers and ditches, and which I shall have occasion to describe in my subsequent pages, although it diffuses but little perceptible odour, has a most deleterious effect upon the nerves of persons exposed to its influence. This plant, the waterdropwort (*Œnánthe crocáta*), very much in its appearance resembles wild celery, and flourishes in watery places. It is recorded of the celebrated botanical painter, Mr. Christopher D'Ehret, that, being once employed in making a drawing of this plant, he was rendered so much indisposed by its scent, that he was many times obliged to quit his occupation and seek the reviving influence of the fresh air; but at length, recollecting the probable cause of his repeated uneasiness, he opened the door and window of the room in which he was painting, and was, by the admission of air, enabled to finish his work.

There is in Professor Kalm's Travels in North America an account given of a species of Sumach called the poison-ash. Of this tree you may have perhaps heard, as its noxious qualities are supposed to have suggested the many tales that formerly obtained belief respecting the upas-tree. The shadow of this tree was said to cast death or sickness upon all over whom it fell; and every

Sumach.

living creature that unwisely wandered under it was reported to fall an almost immediate victim to its dangerous properties. Several species of Sumach are planted in England, but this (the *Rhūs toxicodéndron*) will not, I believe, flourish in our country, although it has been successfully cultivated in France, and used there medicinally.

"An incision being made into the tree," says the Professor, "a whitish-yellow juice, which has a nauseous smell, comes out between the bark and the wood. This tree is not known for its good qualities, but greatly so for the effect of its poison, which, though it is noxious to some people, yet does not in the least affect others; and therefore one person can handle the tree as he pleases,—cut it—peel off the bark—rub it, or the wood, upon his hands—smell it—spread the juice upon his skin, and make more experiments with no inconvenience to himself; another person, on the contrary, dares not meddle with the tree while its wood is fresh; nor can he venture to touch a hand which has handled it, nor even to expose himself to the smoke of a fire which is made with this wood, without soon feeling its bad effects, for the face, the hands, and frequently the whole body, swells excessively, and is affected with very acute pain. Sometimes blisters arise in great quantity, and make the sick person look as if he were infected with a leprosy. In some persons the external skin or cuticle peels off in a few days, as is the case when any person has burnt or scalded any part of his body. Nay, the nature of some persons will not allow them to approach the place where the tree grows, or to expose themselves to the wind when it carries the effluvia or exhalations of this tree with it, without letting them feel the inconvenience of the swelling which I have just now described. Their eyes are shut up for one or two days together by the swelling. I know two brothers, one of whom could, without danger, handle the tree in what manner he pleased, whereas the other could not come near it without swelling. A person sometimes does not know that he has touched this poisonous plant, or that he has been near it, before his face and hands show it by the swelling. I have known some old people who were much more affected by this tree than a viper; and I was acquainted with a person who, merely by the noxious exhalations of it, was swelled to such a degree that he was stiff as a log of wood, and could only be turned about in sheets."

"I have tried experiments of every kind with the poison-tree on myself. I have spread its juice upon my hands—cut and broken its branches—peeled off its bark, and rubbed my hands with it—smelt it—carried pieces of it in my bare hands, and repeated all this frequently without feeling the baneful effects so commonly annexed to it; but I, however, once experienced that the poison of the Sumach was not entirely without effect upon me. On a hot day in summer, when I was in some degree of perspiration, I cut a branch of the tree, and carried it in my hand for about half an hour together, and smelt at it now and then. I felt no effects from it in the evening, but next morning I awoke with a violent itching of the eyelids and the parts thereabouts. It ceased after I had washed my eyes for a while with cold water, but my eyelids were very stiff all that day. At night the itching returned, and in the morning when I awoke I felt it as ill as the morning before, and I used the same remedy against it. However, it continued almost for a whole week together, and my eyes were very red, and my eyelids with difficulty recovered during that time."

The Professor adds that he never had heard that the effects of the tree were more lasting than a few days. In some places the tree is destroyed, that it may not injure those who are obliged to labour near it.

This Sumach, whose pernicious influence was indeed scarcely exaggerated by the accounts of the Upas-tree, is a native of Pennsylvania, New Carolina, and some other places both of the eastern and western hemispheres, and is described as a tall and beautiful tree.

The fragrance of flowers is a source of continual delight to all accustomed to seek their enjoyment in the open air, either of the field or the garden. It affords surely as plain a manifestation of the goodness of God towards us as may be evinced by any indication of the usefulness of plants; since it proves that it is the design of God that life should not only be supported, but enjoyed. James Montgomery has beautifully said that "Flowers are in the book of Nature what the words 'God is love' are in that of Revelation." Yet the poisonous effluvia that I have mentioned as proceeding from some plants, and the offensive scents emitted by others, may at first sight appear to be at variance with my remarks on the benevolence by which the usual operations of nature are directed.

With regard to the poisonous influence diffused on the air, I may remark that it is evidently designed as a warning that we may not eat the plant; that the poison itself is in many instances very useful in medicine, when judiciously administered; and that in many cases, where it appears to render no service to man, it is owing to his ignorance of the purposes to which it might be applied. Many new and interesting discoveries are daily occurring, which should convince us that in the application of poisons there is yet much for the investigations of other days to reveal.

The scent of the carrion plants may, as Sir James Smith observes, be agreeable to the Hottentots, in whose country they abound; and you will not consider this surmise improbable, when you remember that to the Chinese a dish of rotten eggs, however revolting to our tastes, offers a dainty repast. Even where it is impossible to account for fetid odours by these means, we must consider that they are so placed as that it is in our power to avoid them; and that they do not, like the various sweet plants with which our earth is covered, meet us at every step of our country walk. Above all, we must never forget that this world is not in the state in which it came out from the hand of God, when, having looked upon all the works which he had made, he pronounced them "very good." There were no poisons in the Garden of Eden, for death or sickness would never have entered there;

and it was not until God had cursed the earth for man's transgression that it bore briers and thorns. Beautiful and pleasant to the eye and ear as is nature, even yet,—retaining much to win our love and admiration of its beneficent Author,—it yet bears the traces of man's disobedience and consequent punishment.

In the East flowers are often used as expressions of feeling and sentiment. The Chinese and Persian ladies, who, with no mental resources to occupy their many hours of retirement, have much of that taste and love of beauty and elegance which belong especially to Oriental nations, signify love, friendship, anger, disdain, and other feelings, by their various blossoms; and to them the flowers convey a language of their own. We are told that in Persia the tulip, whose blossom in its native country is scarlet, while the centre of its glowing cup is black, is used to express warm affection, and when sent by a lover, will convey to the object of his attachment the idea that like this flower his face is warm, and his heart consumed as a coal.

The gradual progress of affection is expressed by the gift of a rose in its various developments, from the small rose-bud to the fully-expanded blossom; and despair is signified by the nosegay formed of myrtle, entwined with the cypress and the poppy. The two latter symbols would find a ready interpretation in any country; but to us the gay tulip might seem ill adapted to convey sentiment, and would rather remind us of that display which courts admiration. The bergamotte and the jasmine, both of which in Eastern countries possess the most powerful fragrance, are beautifully emblematic of the sweets of friendship.

The gardens of India are of exceeding beauty: ornamented with fountains and filled with every lovely tree and flower, they afford retreats of coolness and fragrance, whose value is greatly enhanced by that intense heat of the atmosphere which renders shade so inviting and refreshing. Very large creeping plants, bearing thick clusters of beautiful blossoms, are trained against high trees, whose branches are never destitute of foliage.

The bright pink acacia and the large magnolia flourish in unrivalled beauty; and amidst this scene of profuse and blooming vegetation birds of gay plumage, and butterflies with every variety of brilliant tint, sport in the boughs of the trees or sip the nectar from the flowers.

The Japanese cultivate their gardens with great care and skill; they are remarkable for the number of their trees bearing double blossoms, as the peach, the apple, and others, which are, during their time of flowering, objects of peculiar beauty. The Japanese appear too to possess some of that taste which is thought almost peculiar to the cottagers of England,—planting little gardens around their houses, and teaching the flowers to wander over their walls.

Dobell, speaking of the flower-gardens of China, says, "In ornamenting and beautifying of gardens the Chinese excel all other nations. By means of a variety of winding walks they make a small place appear twice as large as it really is. Innumerable flower-pots, containing a great variety of beautiful asters, of which they are very fond, are sometimes arranged in a labyrinth from which you cannot get out again without a guide. They seem to have a very extensive assortment of asters; one species is quite white, as large as a rose, with long pendent leaves, and the Chinese eat it in the season as a salad, justly esteeming it a great delicacy. When the asters are all in full bloom, the pots arranged handsomely near a piece of water, and walks and alleys all lighted with variously coloured lamps, a Chinese garden has the appearance of one of these enchanted gardens we read of in the Arabian Tales."

One species of ornament, which other writers mention as peculiar to Chinese gardens, seems in laughable accordance with the idea of their taste which we should have formed from viewing the landscapes on their porcelain. About the gardens are placed small pots on the backs of earthenware buffaloes, pigs, castles, and other images, in which grow dwarf trees. Each of these perversions of nature is formed from the branch of a large elm, or some other tree, which, by their peculiar management, is made to assume the form and appearance of a very ancient but diminutive tree.

The love of splendid illuminations, which the possessors of Oriental gardens sometimes exhibit, seems partaken by a bird of the East. The Baya, or Indian Gross-beak, is said, on the authority of Sir William Jones, nightly to light up its nest, by placing in it a number of fire-flies, whose brilliant but soft light probably pleases the eye of its luxurious little owner.

In many parts of Hindostan it is usual after dinner for a servant to carry round to the guests a silver basin decked with newly-gathered flowers, into which water is poured over the hands. The flowers are placed in a perforated cover, so as to conceal the water from view. In those parts of India where hospitality prevails, a stranger is welcomed on his entrance to a town with wreaths of flowers, which the women and children are eager to offer. In Japan the names of the females are always derived from their beautiful flowers; a delicate compliment paid by the Japanese to those who are so often in poetry called the flowers of the creation.

Among the Greeks and Romans flowers were very profusely employed. The master of a house always provided them when an entertainment was to be given, and they were introduced at the second course. The cypress, in all nations an emblem of sorrow, was used by the Romans to deck the gates of a dwelling in which the body of any person of distinction lay dead. They also carried cypress-boughs in their funeral processions, because, if once cut down, that plant will not spring up again: and, as the Romans were not aware of the resurrection of the body, it appropriately signified to their minds the idea of perpetual death.

In the early ages of Christianity the custom prevailed of carrying evergreens with the corpse to the burial-ground, and depositing them in the grave; implying that the soul was ever-living, and that the body, though now cut down, should spring up again, in eternal youth and beauty, at the day of the resurrection. When the ancient Jews returned from the ceremony of placing their friends in the house for all living, as they expressively called their place of interment, they were accustomed to pluck off the grass two or three times, and, throwing it behind them, to exclaim in the words of the Psalmist, "They shall flourish out of the city like grass upon earth." This practice appears to refer to the resurrection of the bodies of the departed.

The Hindoos place flowery offerings on the shrines of their deities; and Forbes, in his Oriental Memoirs, thus speaks of an interesting custom: "In the Mahomedan cemeteries of Guzerat are displayed the amiable propensities of the female character. To those consecrated spots the Mahomedan matrons repair, at stated anniversaries, 'with fairest flowers to sweeten the sad grave.' The grand tombs are often splendidly illuminated, but the meanest heap of turf has its visitors, to chant a requiem, light a little lamp, suspend a garland, or strew a rose, as an affectionate tribute to departed love or separated friendship."

The Turks in their burying-places, which they call "Cities of Silence," perforate the slabs which cover their graves, and through these openings spring beautiful flowers, which shed their sweets around. These flowers are carefully tended and kept from weeds by the Turkish females. The cypresses, too, with their dark gloomy foliage, mingle with other trees, and by their odour counteract the unpleasant effects which cemeteries in hot climates are so apt to produce, where the coffinless dead are buried at but little depth from the surface of the ground.

The Chinese plant flowers and shrubs about the places destined for the last reception of their families; and in many instances approach them through avenues of beautiful and lofty trees. The Germans place upon every grave little clusters of primroses, violets, lilies, and forget-me-nots. The celebrated cemetery of Père la Chaise at Paris presents much of picturesque beauty in its arrangement; and yet the bereaved mourner would generally feel more willing that the remains of his friend should lie in the peaceful churchyard of the village, than in a spot so much visited by the gay and thoughtless.

To the dead these kindly offices matter not; their bodies lie unheeding, and their spirits are far removed: but to the living there is something of soothing pleasure in thus adorning the spot which covers the remains of the beloved. Fit emblems as are flowers of the fragility of life, and meet to picture forth in their spring renewal the rising again of the objects of our regret, they seem well adapted ornaments to the burial-place.

The frequent use of flowers was once much more common in England than it now is, especially that affecting custom of strewing them over the grave of the mourned, or placing them in the hands of a corpse. In many parts of England it is still usual for the attendants at the burial of a young maiden to carry wreaths of flowers behind the coffin—a practice much used on the Continent; and in Russia it is usual to fill the coffins with flowers.

At wedding ceremonies, the rosemary, which by our forefathers was esteemed a plant of great virtue in improving the memory, and regarded as an emblem of wisdom and affection, was always carried by the friends of a bridal party: and flowers and rushes were strewed over the path on which they walked from their dwelling to the church. The bride and bridegroom were after the marriage ceremony crowned with wreaths of flowers. These garlands were sometimes made of myrtle, but in the time of Henry VIII. it was customary to adorn the bride with a chaplet made of ears of corn mingled with flowers. In Holland it is still usual to deck with flowers and evergreens the home of a newly married couple, and to strew plentifully upon their threshold these tokens of kindness and affection.

In all ages and nations flowers have formed a frequent source of allusion in poetry; and to the poetical mind each of our most common blossoms is associated with some idea peculiar to itself. In Oriental writings these allusions are most abundant. Asia was the scene of the narratives recorded in the Scripture; and the Sacred

Writings contain a great number of references to these lovely objects of Nature. Jotham, the son of Gideon, when he made his appeal to the people whom his father had formerly befriended, addressed them in the beautiful and expressive parable of the trees choosing a king. The Jewish nation is spoken of under the figure of a vine; and the exquisite allegory in which the Psalmist so pathetically bewails the injuries done to this vine is justly considered one of the finest effusions of poetry.

Our Saviour following the beautiful custom of his country, a custom as prevalent now in the East as it then was, could in his familiar conversation point his hearers to the flowers, and say, "Consider the lilies how they grow, for they toil not, neither do they spin; and yet I say unto you, that even Solomon in all his glory was not arrayed like one of these:" and drew from their beauty the consoling inference, "Wherefore, if God so clothe the grass of the field, shall he not much more clothe you?"

The Ghulistan, or Rose Garden, a beautiful collection of tales and familiar proverbs, both in prose and poetry, is so popular throughout Persia as to be a book of daily reference; and its contents are common to the poorest and most uninstructed of that nation. It has been translated into English by Mr. Gladwin, and the following is the introduction of its author, Saadi:—"I am able to form a book of roses which will delight the beholders, and gratify all who are present; whose leaves the tyrannic arm of the autumnal blasts can never affect, nor injure the blossoms of its spring. What benefit will you derive from a basket of flowers? Carry a leaf from my garden. A rose may continue in bloom for five or six days, but my rose-garden will flourish for ever."

But the custom of alluding to flowers is not confined among Eastern nations to their writings. The manners and customs of Asiatics vary less during a number of years than those of Europeans; and the practice of introducing poetical allusions, and those often of a beautiful and well-sustained character, is scarcely less common than in those days when the Scripture narratives were penned. Even in their official documents these images are employed; and some of their addresses to British officers are clothed in language which cannot fail to produce a smile upon the countenances of any of our countrymen who are unaccustomed to the glowing and figurative language of the East.

Letter VII.

The Sea—Effect of the Sea-Air on Vegetation—Saline plants—Sycamore-Tree—Cocoa-nut Tree — Mangrove — Rosemary—Tamarisk—Yellow-horned Poppy—Sea-Lavender—Thrift—Samphire—Glaucous Foliage — Sea-Weeds — Plants yielding Soda—Carageen Moss—Opinion of the Ancients respecting Salt in the Soil.

How grand and sublime an object is the ocean! Few can look on it without interest, as its calm waters ripple in soft murmurs upon the bordering sand, and would seem so gentle and placid that the frailest bark might trust their smoothness. And surely none, even the most untaught and usually indifferent observer, can gaze upon its waves, as, agitated by the storm, they dash upon the rocks with almost overpowering violence, without some feeling of awe and of wonder, that they do not overleap the limits appointed them by Him who hath set its bounds to the sea that it cannot pass over. The wild tumult of the waters seems to have suggested to the prophet Jeremiah the image of the human heart when under the first impulse of some agonising grief. "Sorrow is on the sea, that it cannot be quiet," said the prophet, as his inspired eye foresaw the day of anguish that the people should shortly experience.

The air in the neighbourhood of the sea is rendered of a saline quality by having passed over the ocean, and the surrounding soil contains a large portion of salt. You may easily perceive this quality of the air by tasting any of the plants that grow upon the sea-coast; or even by putting to your tongue the linen which has been dried in the air of the beach. This air is so generally considered favourable to the health of the human constitution, that multitudes of invalids annually resort to the sea-shore to enjoy its invigorating influences; but these are far from being friendly to vegetation. None of the corn-plants will flourish very near the sea, and few, except those termed saline plants, will grow if transplanted into its immediate vicinity. Some saline plants will however live on no other soil, while some, whose robust habit seems especially to adapt them for this situation, will yet attain perfection on inland spots.

On the shores of our island few trees will grow; and the Sycamore seems almost the only one which the sea-breezes do not appear to render dwarfish in growth and languid in appearance. The Sycamore, or Great Maple (*Acer pseúdo-plátanus*), is a large tree with handsome leaves. Its form is not very graceful, yet it often gives interest to the landscape by the variety of colour exhibited by its stem, the bark of which peels off at many places. This tree is a very favourite plant with bees, who fly humming around, and extract the sweet substance which exists more or less in every species of maple.

The shores of the Indian seas are thickly planted with the tall and stately Cocoa Palm (*Cócos nucífera*), which rises to a height of sixty feet, and whose summit is crowned with long and flowing leaves, often about twelve feet in length. The waves of the sea carry to the land the large cocoa-nut, and, dashing it on the beach, leave it there to germinate. On no other soil will this tree thrive so well; and, as its root contains an immense number of fibres, few trees are so well adapted to benefit the shore which supports it.

The cocoa-nut tree supplies the Indian with almost every necessary of life. Its strong and durable stem serves in the construction of his hut, and its large leaves are useful in covering its roof, as well as in defending him from the heat of the sun, by serving as a parasol. Of its bark he makes his canoe; and of its numerous fibres he manufactures cordage, sufficiently strong to furnish the necessary ropes for a vessel; while, woven together in another manner, they form the mat on which he nightly reposes. The shell of the nut furnishes bowls for his domestic purposes, and its substance yields both food and drink; a full-grown cocoa-nut affording more than a pint of milk. These nuts are in their native country much larger than those we see in England, because the latter are gathered before they are matured; being in that state much fitter for keeping than when quite ripe. The Cocoa Palm yields also a juice called toddy, from which an intoxicating liquor named arrack is distilled; and of this liquor the natives of these countries are very fond. In Ceylon the various parts of this tree are used for medicinal purposes; and the Otaheitans attribute to the liquid contained in the nut the property of maintaining freshness and youthfulness of countenance, and preserving the face from the lines which time or sorrow would wrinkle upon it.

The natives of countries between the tropics generally attach a high value to this tree; and many legends exist in different parts recording its introduction as effected by a personal visit of one of their gods. The Cingalese tell of the Cocoa Palm, that it will not thrive unless you walk and talk under it; an assertion very plainly contradicted by the majestic Cocoa-tree which springs upon many a shore whose rocks never echo to the sound of a human voice, where the wild beast prowls in undisturbed possession, and the surges beat in lonely music upon the desolate strand.

Gibbon, the historian, writes of the Palm-tree, that the Asiatics celebrate in prose and verse three hundred uses to which the different parts of the tree are applied. The appearance of the Cocoa-tree greatly adds to the picturesque beauty of the landscape. Possessing that slender and upright stem peculiar to the palms, its feathery crown of leaves waves lightly and gracefully before the sea-breezes, and its large fruit, so peculiarly formed to float uninjured upon the waters, falls upon the sands, and is washed into them.

Many islands, as those of the West Indies, have on their shores large forests of mangroves (*Rhizophora*), which grow in the water, and well secure the damp sands from the incursion of the waves. So moist is the land on which it grows, that were it not for an admirable provision, it would soon fall beneath the hurricanes to which it is exposed. Its trunk is placed upon the point of union formed by several roots, which unite at a height of some feet from the ground, making a strong basis on which the stem is to rest. Besides these a number of small shoots arising from the branches and the trunk, and taking root in the soil, add their strength to constitute the solidity of the tree. These trees flourish also upon the coast of Eastern India, and the lower parts of their trunks are frequently covered with oysters, which attach themselves firmly around them. In places where mangroves grow in the sea-water, oyster fishing is attended with very little labour, as the natives have only to walk into the water and cut the oysters off the trees with a hatchet.

In the southern parts of Spain, Italy, and France, large rosemary-trees (*Rosmarínus*), grow on the sea-shores in great number, wafting their perfume upon the sea-air some distance from the land.

Our own sea-side plants are small in size and few in number. The largest and prettiest shrub growing on our sea-coasts is the Tamarisk (*Támarix gállicus*), sometimes called the Sea Cypress. It is probable that this shrub was of foreign origin, but it is now generally numbered among British plants. It received its name from the Tamarisci, a people who dwelt on the banks of the Tamariscus (now called the Tambra), in Spain, where the plant grows in great quantity. It is a most elegant and graceful shrub, often cultivated in shrubberies, where however it after a while assumes rather the character of a tree: its stem becomes taller, thicker, and more branched. The blossoms are of a delicate pink colour, and are succeeded by seed-vessels scarcely less beautiful. The foliage is of a pale green, the stems slender and upright, and those of the branches of a red colour.

On some parts of the coast it is plentiful, as at Sandgate in Kent, where it grows down to the beach, and adorns the cliffs which surround the town and neighbourhood. It

Tamarix gallica.

abounds also upon the sandy shores of the Lizard and St. Michael's in Cornwall; and on many other parts of our coast it flourishes in less abundance. It is eagerly eaten by sheep, and considered very good food for them, but it does not grow in sufficient quantity to admit of their enjoying it, as it is too great an ornament to the lands where it exists to be applied to purposes of pasture.

The Yellow-horned Poppy (*Glaúcium lúteum*) is one of the most showy plants on our sea-coasts, and is much used by marine painters in giving richness and character to their foregrounds. Its blossoms are large and of a bright yellow, and its leaves boldly formed and extremely rough. When the flowers die, long pods are formed, which give the plant a very singular appearance, as if it had a number of succulent pipes upon it, and they are sometimes nine or ten inches in length. The whole plant is about two or three feet high; and if you are accustomed to visit the coast you can scarcely have failed to see it, as it is very general, and grows close down to the sands.

The Sea-Lavender (*Státice Limónium*), a pretty delicate flower, in colour resembling the lavender of our gardens, grows very abundantly in salt marshes or muddy shores near the sea, but not immediately upon the beach. It bears its blossoms in large bunches, and its leaves are broad and pointed at the top. It makes when dried a very pretty ornament for chimney vases during winter, as it retains its form and colour by being merely hung up as it is gathered. Crabbe speaks of it as the "sea-lavender that lacks perfume," and besides this difference between it and the sweet lavender, it does not resemble the latter in its erect mode of flowering, but is spread in a wide and full cluster. The root of this plant is much used in Russia by tanners, and is one of the ingredients used in preparing the Russian leather commonly know to us by its pleasant scent, and its use in making portfolios, work-boxes, and bindings for books. The odour peculiar to it is however derived from an oil made of the bark of the birch-tree; the scent of the birch of cold climates being far more powerful than that of the "fragrant birk" of Scotland or England.

The Rose-coloured Thrift (*Státice Arméria*), so commonly used in gardens instead of box-cuttings, as a border to flower-beds, is also a native of the sea-shore, growing very commonly on high rocks, or on the salt marshes near the sea or river. The asparagus of our tables is cultivated from the wild asparagus of the shores of England; and in Kynance Cove, in Cornwall, this vegetable grows in such quantity as to have given its name to a small island, thence called Asparagus Isle. In its native state, however, it is so inferior in size, that it would scarcely be recognised as the valuable culinary vegetable it becomes by culture. The asparagus was formerly much used in medicine, but it is now chiefly cultivated for the London market.

The Sea-Kale (*Crámbe Marítima*) is an excellent vegetable when well blanched. It is a handsome plant of a purplish colour, and covered with a mealy powder. The flowers are white, and have a pleasant odour. The stalks when just unfolding are the parts eaten as food.

The *Críthmum Maritimum*, or Samphire as it is called (a corruption most likely of the French name, *Herbe de St. Pierre*), is much valued on account of the excellent pickle it makes. This is of a fleshy substance, with small flowers, and its stems are branched and jointed. It is common on some parts of the English coast, but never grows so near to the sea as to be washed over by the waves. An anecdote related by Burnett respecting the samphire proves how important is the acquisition of every species of knowledge, and how valuable may one day prove the information we have acquired. A ship having been wrecked in the year 1821 in the English Channel, off Beachy Head, four only of her crew escaped from finding a grave in its waters. Thrown upon the cliffs by the violence of the waves, in the midst of a dark and tempestuous night, the shipwrecked men clung for safety to one of those eminences forming the promontory, and, in a state of agonizing suspense, with which we who calmly read the narrative can but faintly sympathise, they waited there for the morning's dawn. At every instant, however, the waters advanced, threatening to overwhelm the little spot upon which the mariners had gathered; till they deemed themselves painfully certain that when the tide should have gained its height, their place of refuge would rescue them from destruction no longer. The storm dashed the spray against the rocks; their voices were lost amid the roaring of the winds; and, even had the sailors of any vessel near been aware of their situation, it could have availed them nothing, as they could not have reached the cliffs. In the midst of a scene, such as would have bowed down the energies of the feeble mind, the distressed men endeavoured to devise some means of escape. No scheme could be suggested but that of casting themselves upon the ocean, hoping that by its fury they might be thrown upon a shore where they could retreat beyond the reach of the waves; or willing to perish by a sudden death, rather than to watch in suspense its slow approach. At this dreadful crisis, one of the men, unable to stand against the storm, clung to a weed on the rock, which in one moment a flash of lightning enabled him to discover was a sprig of samphire. Happily, the seaman knew that samphire never fixes its root upon land which the ocean rolls over; and, reassured by this encouraging circumstance, they determined to wait till day upon the cliff, when they were at length released from their distressing position by some people who saw them from the neighbourhood.

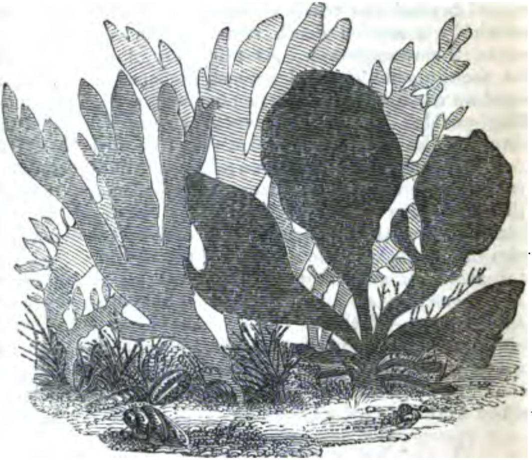
I shall not attempt to describe the joyful emotions experienced by all these men when this discovery was made by one of them. The human heart that beats within your bosom needs not that I should endeavour to call forth its sympathies by any comment on the narrative of an event so affecting. Truly did that poet testify of the works of God who said—

"Nature never did betray
The heart that trusted her!"

It was by the assurance which the mariner felt of the constancy of the laws by which Nature is governed, that he inferred a fact so important in their perilous condition.

Plants which inhabit the sea-shore are remarkable for the peculiar colour of their leaves and stems, they being very generally of that light green tint which we call sea-green, and covered with a mealy substance of this colour, which seems in its nature something like the bloom on the skin of a plum, and may be rubbed off in the same manner. When this mealy powder exists upon their foliage, plants are said to be glaucous. Some of our inland plants have leaves and stems which are glaucous, but their number is comparatively small.

The plants which I have in this letter enumerated do not constitute the whole number of our sea-side plants; but these are the most conspicuous and well-known, and



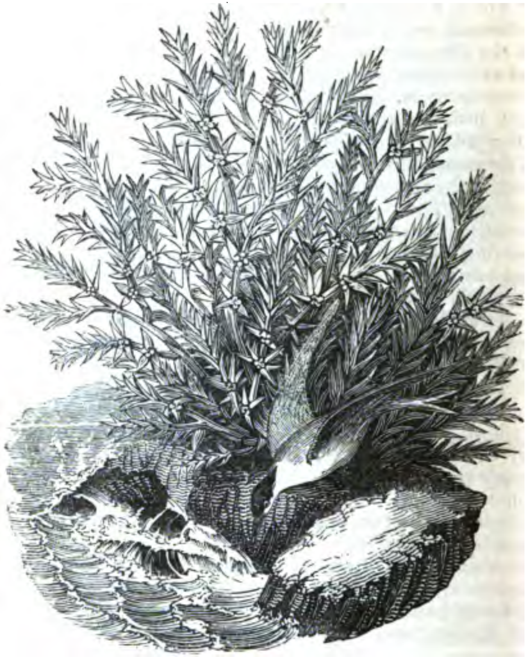
Group of Fuci.

I have not added the remaining few, lest mere description should prove tedious. The great number of Fuci (sea-weeds) which the storm throws upon the beach, or which float upon the surface of the water, show that the depths of the mighty ocean are covered with a variety of plants which afford food to its numerous inhabitants. St. Pierre mentions, that the seas about Cape Verd and the Gulf of Florida yield so great a profusion of floating herbage, that the ocean is covered with it for the space of thirty or forty leagues; so that ships can with difficulty force their way through its entangled mass. The *Fúcus gigánteus*, well known in these seas, is a weed of such magnitude, that one plant is often 700 feet long. Sea-weeds of immense length float about Cape Horn, whose consistence is like leather, so that buckets are sometimes made of them: and Webster mentions having found one pretty green species, that was of an acid taste, while some others afforded a jelly-like substance, resembling isinglass, and far superior to that of the Carrageen moss. Others were of the most beautiful colours, and yielded dyes that may some day be used by manufacturers. The sea around the Cape of Good Hope has little groves of an immense species of sea-weed (the *Fúcus buccinális*), which grows under the water. The stems of this plant are quite hollow, and about six feet high, and from its summit extend large and broad leaves. The Dutch at Cape Town call it the sea-bamboo; and Mr. Burchell tells us that boys, after cutting its stalk to a convenient length when dry, sometimes amuse themselves by blowing it as a horn or trumpet.

The Chinese and Japanese esteem some species of sea-weed a great delicacy for the table. Another species makes a very pleasant pickle.

The Carrageen moss (*Fúcus Críspus*) is a species of sea-weed, found on the rocks or in salt pools near the sea. It is very common on the coast of Ireland, and is called by the country people, who collect it, Irish moss. On many parts of our own coast too it may be found. Sometimes it grows very plentifully on the southern shores of England, and at other times it can scarcely be found there at all.

A plant that grows by the sea-side, or in the neighbourhood of salt rivers, called Glasswort (*Salsóla*), is in some of its several species very common on all the coasts of Europe, and is cultivated in some of the southern countries, especially in Spain, on account of its use in the manufacture of soap and glass. The only species on our shores (the *Salsóla Káli*, or prickly glasswort) raises its awl-shaped rough leaves and angular stem on the sandy margin of the sea; each branch bearing one small pale-green flower. A plant which, in its English varieties at least, yields a greater portion of salt, and better deserves its English name of glasswort (*Salicórnia*), is not unlike the samphire in appearance; and its succulent and jointed stems are often used for a pickle instead of that plant, though certainly inferior.



Prickly Glasswort—*Salsóla Káli.*

All the succulent plants which grow near the sea contain, in a greater or less quantity, a portion of alkali or soda, which is procured by burning the plants to ashes. When extracted entirely from saline plants, it forms the well-known soda used for medicinal purposes. The same substance, though of a coarser nature, is obtained from burnt sea-weed, and called kelp, which is used in making glass and soap. The people living in the neighbourhoods of the sea collect the sea-weeds and burn them for this purpose: and kelp forms a very important article of commerce in the islands of Scotland, especially the Orkney Islands. Many of the inhabitants of the Orkneys derive their entire support from the manufacture of kelp, which is of more value than the produce of the same substance obtained from any other of the Scotch islands.

So much of the soda is contained in these ashes, that in glass manufactories it is not an unfrequent circumstance for crystals to be formed upon the faces of the workmen, owing to its evaporation during the process of glass-making. In some of the inland parts of Asia, whose inhabitants are too far from the sea to procure from it the salt used for their domestic purposes, and where the land is destitute of the salt mines and springs which afford the usual resource, the natives procure their salt from burnt vegetables, especially from a species of duck-weed. In many parts of Hindostan salt is so expensive, owing to the process by which it is obtained, that it can only be applied to those uses in which it is of absolute necessity.

At Bambouk, a kingdom of Africa situated on the hottest part of the globe, the indolent and careless natives have not discovered that salt exists in vegetables; and, ignorant of this mode of procuring it, and their land being wholly without salt mines and springs, they are glad to purchase this necessary of life from the Moors, and to give them gold in exchange.

The mixture of some portion of salt with the soil is considered by agriculturists as an improvement to its nature; but when it contains a great quantity, few plants will arrive at perfection. Among the ancients the presence of salt in the soil was considered so detrimental to vegetation, that, when they condemned a field to sterility, it was customary to sow it with salt.

LETTER VIII.

Sap—Vegetable Secretions—Milk—Opium—Excessive use of Opium in Turkey—Poppy—Milk-bearing Tree—Sugar—Acid—Wood Sorrel—Gentian—Wood Sage—Flint in Plants — Horsetail — Resins—Gums—Asafœtida—Indian Rubber—Oil—Attar of Roses—Uses of Oils—Olive-Tree—Wax Palm—Tallow-Tree—Soap Berry—British Soapwort—Cotton-Plant—Tree yielding Wool.

THERE is, as you are probably aware, a fluid in plants, somewhat similar in its uses to the blood of animals, called sap. It is formed from various fluid substances absorbed from the earth by the root. From thence it ascends into the stem, and is impelled into the leaves, where it is exposed to the atmosphere and made to undergo those chemical changes which fit it for the production of what are called the proper juices of the plant, and of the materials of which the plant itself is made. From the leaves it returns into the stem, forming in its course the substances peculiar to the plant, and depositing them in cells appropriated to their reception. The sap very much resembles water; and may be obtained for examination by making an incision in the branch of a grape-vine, early in the morning. The vegetable products or secretions, to which I have alluded, are gum, milk, odour, acid, &c.

It is of these I am about to treat; and this is a subject very interesting. As, however, the consideration of every secretion peculiar to plants would rather require a volume than a few pages, I shall introduce either those which are likely to come immediately under your own notice, or others which by their uses or peculiarities would probably excite your curiosity.

The several varieties of Spurge (*Euphórbia*), one of which, the sun spurge (*Euphórbia Helioscopia*), is common as a weed in almost every garden, secrete a white juice of a poisonous nature which is often applied as a cure for warts. Plants affording a milky juice are called lactescent, and this class, except when they are of the order of compound flowers, as the dandelion, are generally of a baneful and destructive quality. A juice similar in appearance to that of the spurge, but different in its properties, is yielded by the various species of lettuce, and several other plants, whose flowers are compound, and is administered to invalids to soothe pains and restlessness.

The opium, which is so valuable a medicine when judiciously used, and which is often given by the physician to mitigate suffering, is smoked and chewed by the natives of Eastern countries, in most pernicious quantity. It is procured from the white poppy (*Papâver Somniferum*); but all the species of poppy possess in some degree the same narcotic principle. Opium is very exhilarating when first taken, producing an agreeable excitement; but its effect upon the mind and body after this has subsided is extremely exhausting and depressing, and fatally destructive to the energies of both.

The delightful reveries which it causes the excited imagination to produce render the frequent use of opium very agreeable to the indolent natives of Eastern countries; but nowhere is it so much used as in Turkey.

At Constantinople the smokers of opium assemble at their coffee-houses, and, sitting around them in the open air, indulge in a practice no less exciting than that of drinking ardent spirits, and even more rapid and fearful in its ravages upon the constitution. Here the Turk inhales his opium, which soon has the effect he desires to attain. A pleasing delirium commences: he perhaps fancies himself an orator, and addresses his companions in glowing, and sometimes eloquent language. Amid the most frightful gestures, loud voices mingle with each other, and the confusion soon resembles that of a party of Bacchanals. Its deleterious effects upon the constitution are shortly manifest; many of its victims have distorted necks; others have the joints of their fingers contracted; the whole body trembles, and, with the gradual loss of appetite, debility increases.

Early death is the inevitable consequence of excessive indulgence in the use of opium; and rarely indeed does the unhappy being who practises it exceed the age of thirty years. A gradual feebleness of mind is induced by this drug, which impedes every attempt to overcome difficulties; and each succeeding year renders the opium-eater less able to make the necessary attempt for the resistance of the habit. Many of the Turks, indeed, so enjoy the delirium produced by it, that, although conscious they are hastening themselves to the grave, they would be made miserable by the idea of relinquishing their indulgence, and are restless and uneasy while awaiting the daily period for its gratification.

How melancholy is this picture! Alas, that men should thus turn a blessing of Providence into a curse, by perverting that which was intended as a valuable medicine into a poison, that which was designed as an antidote to ill, into a source of bitter suffering! The late great author and excellent man, Coleridge, who commenced the use of opium in a less degree as a medicine, became so accustomed to its stimulating effects, that he had not courage to check the growing habit, until the practice of taking it had rendered him languid and distressed in mental and bodily feelings. Few can read the lines in which he laments with pathetic anguish the influence this habit had acquired over him, without deep sympathy; and none ought to read them without being impressed with the importance of checking in its commencement every pernicious habit.

Opium is made by cutting incisions in the large seed-vessels of the white poppy when fully ripe; a process regularly performed during several evenings at sunset. From the openings a milky juice exudes, which dries into a hard substance that is scraped off the next morning and made into cakes. Opium has been made in England by this process, and has been considered equal to the foreign drug.

The fields of white poppies planted in England for this and other purposes have a very beautiful appearance, as their large white flowers float upon the breeze, nodding upon their tall stems; or when the winds are stilled, giving the field a resemblance to a plain of snow, surrounded by green hedges and verdant lanes. I have seen plantations of lavender and fields of roses, which could not at all vie with these in elegance of form or loveliness of colour.

In some parts of India and the south of Europe, the white poppy is reared extensively for the purpose of making opium. In England, however, the fields of poppies which we see planted in different counties are more generally designed to afford a supply of the seeds which are so useful in medicine.

The poppy may be cultivated in most countries, but is peculiarly a plant of cold climates; and is found, both in its red and white species, in those desolate regions near the poles, where little else is to be met with but mosses, lichens, and plants of a similar character.

In India, the poor Halcarras, or messengers, often take long journeys with no supply of food but a little rice and a small quantity of opium; and they are enabled, by the temporary stimulus afforded by the latter, to make exertions which, when the heat of the climate is considered, would appear almost incredible if not well authenticated.

When a horse is to be sold at any of the markets in India, whose viciousness would, if known, prevent his obtaining a purchaser, the native Indians, who are too often ready to deceive the British residents, administer to him, as a sedative, a small dose of opium: and the unruly animal appears, when under its influence, to be of a most gentle and tractable disposition.

Some of the many species of the poppy that our gardens exhibit possess great beauty; yet this is not generally a favourite flower—chiefly perhaps because of its powerful scent. The common red poppy, although regarded by the farmer as a troublesome weed, is a very handsome flower; its brilliant and deep scarlet forming a fine contrast to the pale brown colour of the ripened corn.

The ancients were evidently aware of the narcotic principle that exists in these plants. Somnus, the son of Night, and the god of slumber, whom, notwithstanding their learning and refinement, the Greeks ignorantly worshipped, is poetically and beautifully represented by a child in that attitude of deep and scarcely breathing slumber peculiar to childhood, and pillowed upon a bunch of poppies, which he holds in his hand.

Some plants emit upon bruising a juice of an orange colour. This juice may be seen to ooze from the larger Celandine (*Chelidónium május*) when its stem is bruised. This plant grows especially on waste places near towns and villages. It has large leaves deeply cut at the edges, with flowers of a bright yellow, and unpleasant smell: a similar juice is afforded by the water dropwort and some other plants, and is always of a poisonous quality.

The milky substances I have mentioned become gums by exposure to air. A more remarkable kind of milk, much resembling animal milk, is yielded by a tree, which Webster and Humboldt have both described; and which may be found growing all along the Cordilleras of the coast of South America. It is a very handsome tree, yielding in beauty and loftiness to few which may be met with even among the gigantic trees of these forests. Its trunk is a hundred feet in height, and a delicious fruit, in flavour resembling a strawberry, hangs plentifully among its foliage. The Palo de Vaco grows on the soil which covers the surface of a barren rock, and for several months in the year its foliage is never moistened by a single shower. It is described by Webster in his account of the voyage made by Captain Foster in the Chanticleer. He met with it at Para. "It seems rather startling," says this gentleman, "to talk of a tree yielding milk; yet such is the fact, and it is drunk by the people in large quantities, and was used by us on the gun-room table for mixing with tea, in lieu of cows' milk, from which it is no way distinguishable in general use.

The milk is a rich white, bland fluid, without odour, and of the taste and flavour of common milk. It mixes readily with tea or coffee, without curdling or undergoing any change, and in every respect seems like cows' milk. Boiling water does not alter it. It keeps unaltered six or seven days, in the temperature of 85°. It appears to differ from all the known milky juices of plants, and to approach in obvious properties to animal milk, from which it differs in chemical composition. There is no cream nor caseous matter.

"I kept a little of the milk until our arrival at Trinidad, eight weeks after my procuring it, when it was sent to the Admiralty. Some which I had myself had then separated into a sourish milky water, and a white solid mass, which, when taken out and dried in the air, was a white inflammable substance; not softening at the temperature of the body, melting at 143°, tasteless, insoluble in water or spirits, and resembling white wax more than any other substance to which I could compare it. It burned with an agreeable flame, without smelling, and was neither greasy nor resinous. I am therefore inclined to consider it as a species of wax."

You will not be surprised to find that this tree is the daily resort of the natives of the places where it abounds. At sunrise the milk is most plentiful, and, at an hour rendered delightful, on account of the cool refreshing contrast which it presents to the later hours of the day, they assemble with their bowls to receive the copious draught. By making a wound in the trunk of the tree the milk pours out, and the mother carries it home for the nourishment of her expectant family.

Sugar is secreted in a greater or less quantity by almost every vegetable. The sugar generally used in England is obtained from the sugar-cane (*Sáccharum officinârum*), by pressing the cane between iron rollers, until the juice is squeezed out, when it is subjected to some other processes, until it forms into crystals. Our chief supply is the produce of the West India Islands, to which the cane was originally brought from China; but the cane is cultivated with great success both in the East Indies and in

South America. This plant is a jointed reed, of a fine straw-colour, which terminates in blades or leaves, the edges of which are finely notched. When in bloom its flowers grow in a cluster of a delicate silver colour, and are very handsome.

The presence of sugar in the carrot and parsnip may be easily detected by the sweetness of their flavour, and the beet-root contains it in great abundance. The French,

Sugar-cane—*Sáccharum officinárum.*

at one time, extracted a considerable supply from the root of the white beet; and some manufacturers of that nation expected that improvements upon the process would, in course of time, enable them to produce an article equal to that of the West Indies. In this, however, they were not successful, as the expense of making the sugar from the beet is very great, and the sugar itself inferior in quality.

Among the North American Indians sugar is obtained from a species of maple (*Acer saccharinum*), and the sugar yielded by this tree seems nearly equal to that afforded by the cane. A sweet juice issues from the maple upon making an aperture in the stem of the tree, which when prepared by a process similar to that employed on the cane-juice, becomes sugar. A common sized tree will in the month of April or May yield two or three gallons of juice daily, without at all injuring the tree. This maple is about forty feet high, and is very plentiful throughout the United States. The maple-juice has also been employed in France for making sugar,

Sugar Maple—*Acer saccharinum*.

and from the same species the Canadians extract their vinegar, and the Highlanders make wine. There are several species of acer, and all of them contain sugar. The wood of our maple or sycamore-tree is used in inlaying cabinet-work, for which its hard and knotty texture renders it peculiarly adapted.

No substance yields a greater supply of nourishment, in an equal quantity, than is afforded by sugar.

The Canadians in their excursions take with them, in little baskets, some corn previously dried and ground, and some maple-sugar. Their meal sometimes consists of a few spoonfuls of an equal portion of corn and sugar, mingled with a pint of water; yet this simple food is sufficient to maintain their strength for some days. In the West Indies a pound of sugar mixed with a small quantity of grass or hay supports the strength and spirits of a horse during the day's labour.

Acid is very generally secreted in different portions by all vegetables. The common wood-sorrel (*Oxális acetosélla*) is probably well known to you by the acid flavour of its triple leaves. This plant is very common in woods, flowering in spring and during the whole of the summer. It is often worth while to search for it in winter, as its leaves may be found covered up from the cold by the fallen and withered foliage which has been scattered by the autumn; and they have perhaps grown securely under the additional mantle of snow which is cast over the plants by the winter storm, and which serves to shelter them from the nipping frosts. The leaves, which are similar to those of the common clover, are used in some countries to form a conserve; being for this purpose pounded in a mortar with sugar. Their acid quality renders it a pleasant medicine in feverish complaints, and at all times during summer an agreeable beverage if mingled with milk. I believe school-boys are so much accustomed to gather this plant and eat it with their bread and butter, that I need hardly inform you it bears a white flower.

Wood-sorrel grows in very cold countries, and was found by Captain Parry in places where scarcely any

Wood-Sorrel—*Oxális acetosélla.*

other flower imparted animation to the scene. When he saw no longer the wood-sorrel, he had reached the dreary regions of perpetual snow.

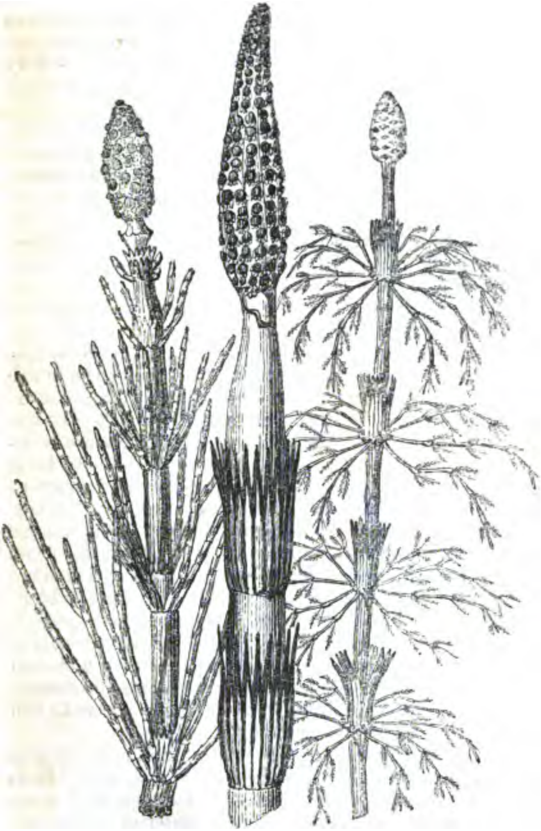
From its juice the powerful oxalic acid is extracted. A plant to be found in every meadow, and which perhaps you have been used to call sorrel, but which is a species of dock (*Rúmex acetósa*), affords a pleasant acid, though it is not so powerful as that of the wood-sorrel.

The bitter substance secreted by some plants may be instanced in the common gentian of our fields (*Gentiána campestris*), a plant which is used by the Swedes instead of hops. It is frequent on hilly pastures, where the soil is chalky in most parts of England. Its flowers are of a purple colour, and cover the plant in great profusion, blooming in the months of August and September. The roots are the parts chiefly used in medicine, and much gentian is procured from the mountainous districts of Germany for this purpose.

The aloes, whose bitter as a drug is so well known, is the juice contained in the leaves of a plant of that name, which is boiled until it becomes of a proper consistency, when it is left to harden. This aloe is brought from the isle of Socotra in the Arabian Sea, ready for commercial purposes.

A plant sometimes substituted for hops, or mingled with them by country-people, is the wood-sage (*Teúcrium scorodónia*). The whole of this plant is so bitter that the flavour will long remain on the tongue. It grows about a foot high upon roads and dry banks. Its stems are purple, and its blossoms of a greenish yellow. The leaves somewhat resemble those of the garden sage, and are much wrinkled.

Perhaps there is not any vegetable secretion that will seem to you more wonderful than that of flint. What uninstructed eye, as it gazes upon the frail and delicate texture of the small plant which is growing near it, would detect the presence of one of the hardest substances in nature in its slender stem and small branches? The discovery that flint exists in grasses and some other plants has been made but a few years. In wheat-stalks it is found in considerable quantity. The various kinds of horsetail growing wild, some of them in ditches, others by road-sides or in moist woods, contain a larger portion of it. One species or another of this plant can scarcely fail to be known by you, as they are very common in all parts of England, and you can hardly have wandered over lands watered by streams without remarking them. They have rigid and furrowed stems, and have about the latter end of summer catkins or cones at the tops of these stems. Their long green branches, which are so slender and numerous as to have suggested



Equisétum hyemále.

the name of horsetail, are situated around the stem in a whorl; they are jointed, and if pulled will separate into pieces at the joints. If you examine these joints you will see that they are formed by several small chaffy teeth, which fix into each other, and which, though minute, are quite regular and perfect.

The rough horsetail (*Equisétum hyemále*) is of the most flinty nature, and is brought hither from Holland, under the name of Dutch rushes, to be used in polishing ivory, hard wood, brass, and other substances, for which purpose its hard and rough nature renders it suitable. The stem of wheat, when reduced by burning to a powder, is used to give a fine polish to marble and some other articles.

To that eminent chemist, Sir Humphry Davy, we are indebted for the discovery that some plants contain flint: and it is very interesting to remark how much an improvement in any branch of natural science assists in the advancement of others. Facts ascertained by the geologist are often extremely important to the botanist. To the experiments of chemistry every student of Nature is indebted; and, since the improvements which have been made during late years in the microscope, the structure of plants and of the minuter animals has been much better ascertained, and more generally known. Knowledge gained by study or observation is always valuable; for, besides that it may be useful for any purpose which we had not anticipated, it produces a mental activity, which, as a habit of mind, is of incalculable service to the young. Too many there are, who walk amid the most beautiful scenes of Nature, or wondrous productions of art, unmoved and uninterested; and of whom, as regards the natural world, it may be said, that "Seeing they see not, and hearing they do not understand."

Resin is a substance which exudes from many plants, and is capable of being dissolved only by spirits. Gum can be dissolved by water; but several substances flowing from vegetables are soluble either by water or spirits, and are called gum-resins. The gum afforded by many trees of our orchards, as the cherry and the plum, is familiar to you. One peculiarity among others which distinguishes gum from resins, or gum-resins, is that it is tasteless; but the latter are often described under the common name of gums.

The Gum-Arabic of commerce is very similar in its nature to that of our British trees, and is imported chiefly from the shores of the Mediterranean. It exudes from a species of Acacia (*Mimósa*), and is used in medicinal preparations, as well as in several manufactures. So much nutriment is afforded by this gum, that on one occasion, when a party of travellers in the Desert were destitute of food, and far removed from the means of procuring any, they subsisted for several days solely on gum-arabic, and scarcely felt the pressure of hunger or the decrease of strength.

The powerful and offensive-smelling Asafœtida, so frequently used as a stimulating medicine, is a resinous gum formed of the hardened juice of a plant of that name, the Ferula Asafœtida, which grows wild in Persia and the East Indies. This juice when it first flows from the root is a white liquid substance, but forms into masses by exposure to air.

Disgusting as is the scent or flavour of this drug to our senses, the Brahmins of Hindostan eat with relish a kind of cake made with flour, and highly seasoned with the powerful Asafœtida. The resinous juice of the Scotch fir (*Pínus Sylvéstris*) affords turpentine. The birch-tree of cold countries contains in its bark so large a quantity of resinous matter, that it is frequent'y cut into strips, and, being twisted together and made into torches, will burn for several hours.

Caoutchouc, or Indian rubber, is a resinous gum that flows from a tree which is a native of warm climates. The Hevéa, from which it has been chiefly derived, grows in Brazil, in the woods of Demerara, and many other of the lofty forests of tropical America; and is as tall as any of the trees which may be found there. A large climbing plant in Sumatra and some other places (the *Urcéola Elástica*) yields the same substance, though its different mode of preparation gives it an appearance somewhat dis-

Scotch Fir—*Pinus Sylvestris.*

similar from the produce of the western hemisphere. The milky substance is contained in the bark of the tree, and when this is cut it freely oozes out. It is white, and has about the consistence of cream. In South America this juice is spread several times over a mould of earth, and dried in the sun. When the coat is thick enough, the mould is broken, and thus we generally receive the Indian rubber imported from America in the shape of bottles. That prepared at Sumatra is, in consequence of a different process, usually in small square pieces.

The uses of Indian rubber in obliterating marks made with the pencil, and in making surgical instruments, are well known; and the daily improvements in manufactures suggest many other purposes for its application, as the making of shoes and great-coats, through which the rain cannot penetrate. The American Indians make large boots of it, and, having well dried them in the sun, they have the appearance of leather.

The Indian rubber hardens, almost as soon as its flows from the tree, so that a ball may be formed of it by making it into a globular shape as it oozes out, which becomes hard and black by being exposed to the sun. An anecdote of an imposition practised upon Mr. Waterton, during his wanderings in South America, will, I think, amuse you. "Some years ago," says Mr. Waterton, "when I was in the Macoushi country (in Dutch Guiana), there was a capital trick played upon me about Indian rubber, which shows that the wild, uncultivated Indian is not without abilities. Weary, and sick, and feeble, through loss of blood, I arrived at some Indian huts which were about two hours distant from the place where the gum-elastic trees grew. After a day and a night's rest, I went to them, and with my own hands made a firm ball of pure Indian rubber: it hardened immediately as it became exposed to the air, and its elasticity was almost incredible.

"While procuring it, exposure to the rain, which fell in torrents, brought on a return of inflammation in the stomach, and I was obliged to have recourse again to the lancet, and to use it with unsparing hand. I wanted another ball, but was not in a fit state to proceed to the trees. A fine young Indian, observing my eagerness to have it, tendered his services, and asked two handfuls of fish-hooks for his trouble. Off he went, and to my very great surprise returned in a short time. Bearing in mind the trouble and time it had cost me to make a ball, I could account for this Indian's expedition in no other way except that, being an inhabitant of the forest, he knew how to go about his work in a much shorter way than I did. This ball, to be sure, had very little elasticity in it. I tried it repeatedly, but it never rebounded a yard high. The young Indian watched me with great gravity, and, when I made him understand that I excepted the ball would dance better, he called another Indian who knew a little English, to assure me that I might be quite easy on this score. The young rogue, in order to render me a complete dupe, brought the new moon to his aid; and he gave me to understand that the ball was like the little moon, which he pointed to, and by the time it grew big and old the ball would bound beautifully. This satisfied me, and I gave him the fish-hooks, which he received without the least change of countenance.

"I bounced the ball repeatedly for two months after, but I found that it still remained in its infancy. At last I suspected that the savage had (to use a vulgar phrase) come Yorkshire over me, and so I determined to find out how he had managed to take me in. I cut the ball in two, and then saw what a trick he had played me. It seems he had chewed some leaves into a lump about the

Ricinus communis.

size of a walnut, and then dipped them in the gum-elastic. It immediately received a coat about as thick as a sixpence. He then rolled some more leaves round it, and gave it another coat. He seems to have continued this process till he made the ball considerably larger than the one I had procured; and, in order to put his roguery out of all chance of detection, he made the last and outer coat thicker than a dollar."

Castor oil, so valuable as a medicine, and one which is used more frequently in the East than with us, is obtained from the tree called Palma Christi (*Rícinus Commúnis*), which grows in the East Indies, by pressing the nuts of this tree. It is a handsome tree, about forty feet high, and often cultivated for its oil. The leaves of the Castor Oil tree are by the natives of the East applied externally as a remedy for some complaints with great success. The Chinese employ this oil in cooking, but they have some means of altering its flavour.

The sweet oils of general use are obtained either by the expression, chiefly of seeds of different plants, or by distillation from sweet-scented flowers, as the rose and jessamine. The delicate oil of Attar of Roses is made in Persia, and some parts of Eastern India, and is highly valued by the luxurious natives of those countries. It is the pure essential oil of roses, and is found in small particles on the surface of newly-distilled rose-water, of which it requires many gallons to yield only a few drops of the attar. When this has been skimmed off, the rose-water is sold to those who are not rich enough to indulge themselves with the more expensive perfume.

As no candles are burnt throughout India, many very beautiful trees and shrubs are planted for the oil they afford. The oil extracted from the cocoa-nut is used in great quantity; but as the cocoa-palm will flourish only near the sea, this tree furnishes no supply to many inland districts, and large plantations are formed of the trees whose seeds contain oil.

Oils procured from vegetables are used in India for anointing the body, for religious ceremonies, and for an immense number of nightly lamps; so that the preparation

Cocoa-nut Palm.

of its different kinds gives employment to many of the natives of India.

The altars of the superstitious Hindoos often consist of a plain white slab, over which they pour oil as an offering to their deities. The practice of consecrating stones seems very ancient; and Jacob when he wished to sanctify the spot where a beautiful and encouraging vision had been afforded him, set up the stone on which his head had lain, and poured oil over it.

Often at night-time may be seen upon the stream of the Ganges a small lamp lighted with oil, which is sent floating upon its voyage by some Hindoo girl, as an offering to her deity for the propitious voyage of some beloved friend. Sad would be the heart of that maiden should its small light be by any accident extinguished; for then would she superstitiously imagine that the wind and waves would be adverse to him whom she thus remembers. As, however, she watches its little light burning until distance conceals it from her view, she fondly hopes that her offering is accepted, and his safety ensured.

Well may we breathe the sigh of sympathy as we see feelings thus kindly, feelings which adorn the most enlightened of our species, linked with a superstition so misguiding and degrading as that of the Hindoo faith!

In the South of Europe, oil obtained from the fruit of the olive tree (*Olea Europæa*) is commonly used for the same purposes for which we employ butter; and those accustomed to its use would as little relish the butter we obtain from milk as we should enjoy the oil which supplies their tables. The olive-tree is cultivated in large plantations, and it gives a very peculiar appearance to the landscape where it abounds. Its leaves have that dark and sombre tint which we generally call olive-green; and when the wind stirs the foliage, and raises their white under-surfaces to view, they look like a stream of light floating amid the gloom of their dark boughs. Often, too, the bright skies of a southern summer are spread over the scene where groups of olive-gatherers, with skins embrowned, and eyes of dark and soft radiance,

Olive-tree—*Olea Europæa.*

are scattered around the trees. Let us hope that they obey the kind injunctions of Scripture respecting this plant, and leave of the shaking of the olive-tree for the poor of the land. The olive-tree grows wild in some parts both of Asia and Africa, and also in Greece.

The olive will grow in England; but the tree, which in more congenial climates is always arrayed in its deep green mantle, loses its leaves in our colder atmosphere. The oil, which we chiefly use for salads, and which is imported in bottles covered with wicker-work, is procured by pressing the fruit in sacks made of coarse linen.

This oil is in some countries used for anointing the body, and among the ancients it was poured out of vases upon the ground as a libation to the gods. Plantations of olives are by most travellers thought very beautiful, though some speak of "the unlovely green of its foliage." The flowers are very pretty, of a delicate yellow colour, and the fruit you have often seen, as it is brought to England in bottles after being salted.

In some parts of the interior of Africa the Negroes are furnished plentifully with a kind of vegetable butter by a tree called the Shea, or Butter-tree. This is a large and handsome tree, and travellers have described it as very much in appearance resembling the American oak. The butter is obtained from the kernel enclosed in the fruit, which upon being dried in the sun, and afterwards boiled in water, produces a substance exactly resembling the butter which is the produce of our dairies. It has, too, this advantage over the butter made of milk, that it does not require salting for the purpose of keeping, and is besides firmer in its substance and richer in its flavour. Mungo Park considered its taste superior to that made of cows' milk, and adds that the Negroes not only use this butter for their family supply, but that it forms among them a considerable article of barter.

Upon the heights of the Andes, or Cordilleras, a chain of mountains that extend nearly from north to south of the continent of South America, grows a handsome species of palm, whose trunk is covered with a thick substance very much like wax in its nature and appearance, and applicable to the same uses. The Wax-Palm (*Ceroxylon Andicola*) attains the immense height of 160 feet, and is able to bear a greater degree of cold than any other species of palm; all of which are natives of hot climates, and generally unable to bear the atmosphere of elevated situations.

The nut of the Tallow-tree(*Cróton Sebiféra*), a native of China, contains in abundance the substance from which it derives its name. Several of these kernels are contained in the pods, which are about the size of a chesnut, and succeed the blossoms of this tree. They are full of a white pulpy matter, exactly of the colour, consistence, and smell of the tallow procured from animal substances. The only preparation necessary to render it fit for the purposes of commerce, is that of dissolving it, and in some cases mingling it with oil. This tallow is used by the Chinese for their candles; and these are said to burn as well as those manufactured in Europe from wax, and are equally free from any unpleasant odour.

The appearance of the tallow-tree is singularly beautiful; and the large plantations of it cultivated in China add greatly to the interest of the scenery. The flowers are yellow, and the colour of the leaves has that variety at different seasons of the year which tropical foliage so often exhibits; changing from a deep crimson to a rich purple tint, giving an appearance to the landscape of great brilliance. A number of these trees are said, when at a distance, to resemble a profusely blooming flower-garden.

A kind of soap frequently used in the East and West Indies, instead of being, as soap is with us, a commodity resulting from the experiments of the chemist and the skill of the labourer, is obtained by merely plucking the outer rind from the black berries of the soap-tree (*Sapíndus*). These berries you have perhaps seen used in England for necklaces; and they are the fruit of a tree, a native only of warm countries, which rises to the height of twenty or thirty feet. As its white blossoms fall away, its fruit is formed. This is about the size of a cherry, growing either singly or in clusters, and its covering contains the soapy matter.

The soap-berry is much used for washing in America, but if used in too great quantity, or in a careless manner, it destroys the linen to which it is applied. In the East Indies it is preferred to manufactured soap for washing shawls, silks, and embroidery. It lathers in salt water, which renders it very serviceable at sea, where common soap is almost useless.

A pretty wild plant in our own native woods is called

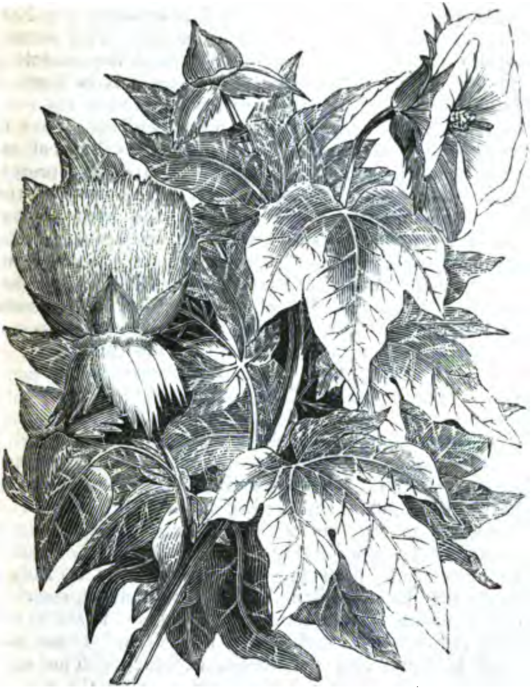
Soapwort—*Saponaria officinalis.*

soapwort (*Sáponaria officinalis*), from its possessing a similar property. Its flowers, situated in a cluster at the top of a stem about a foot high, are rather large and handsome, and of a pale rose-colour. It is a pleasing-looking plant, and it yields a soft soapy juice, which has sometimes been employed instead of soap; but the quantity of this material produced by the plant is so small, that it is not likely to supersede the article of the soap manufacturer.

That wise Providence that has placed the natives of tropical climates in such situations as are unfavourable to the attainment of great bodily vigour or mental energy, neither of which seems scarcely to exist under a vertical sun, has afforded them many plants that yield spontaneously those articles of comfort and luxury which in the more moderate temperature of our climate must be procured by industry and science.

But, although the vegetable products of our own country are in this respect very inferior to those of the countries between the tropics, we have no cause to complain, on this account, that our advantages are fewer. The energy which enables us to meet difficulty and overcome it, the satisfaction that arises from an active and diligent pursuit of knowledge, are ample compensations for luxurious ease and languid indolence. Wisely and kindly has the Great Governor of the Universe

Cotton Shrub—*Gossy'pium.*



Cotton; showing a pod bursting.

adapted our respective allotments to our respective wants.

I shall conclude my letter by giving you an account of some singular vegetable substances contained in the seed-vessels of plants of foreign countries.

The cotton which is so valuable an article in manufactures, and of which so much of your own clothing is

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and sewing the leaves together, makes for itself a cool and shady little dwelling, which it swings upon the bough of the cotton-shrub.

At Guyaquil grows a tree which produces a substance less singular than cotton. The Ceibo-wool (*Láno de Ceibo*) is a very high and handsome tree, its stem perfectly straight, and its boughs and foliage tufted at the summit. This tree presents a most striking appearance either when covered with its profuse white blossoms or its bursting and ripe pod, which when dried by the opens and displays a beautiful and silky tuft of wool reddish colour. The pod is two inches in length, the texture of its contents so soft and delicate hitherto no use has been made of it in manufacture; though some travellers think that the wool is capable of spun, and that should this ever be the case the will deserve the name of Ceibo-silk.

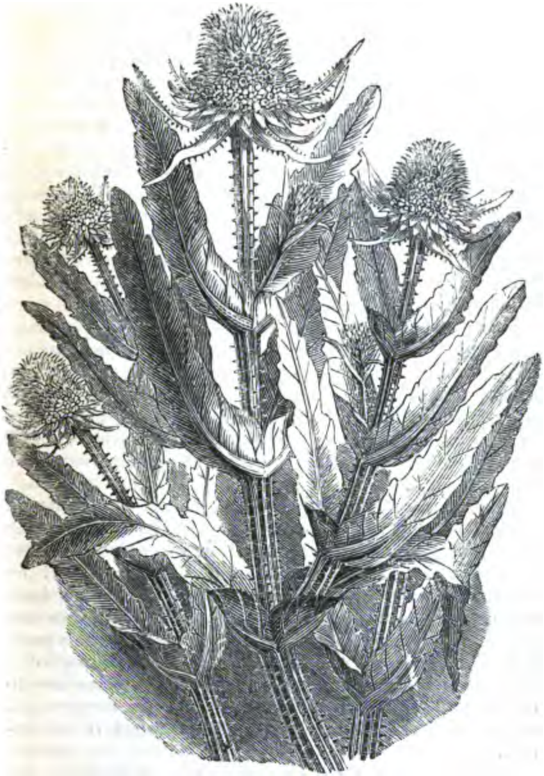
The natives of Guyaquil fill mattresses with it, and are described as being of a very superior quality; soft nature of the wool fitting it to yield upon pressure, rise again upon being laid in the sun, even so as to stretch the covering of the mattress. Damp- alone injures these mattresses, for when placed in a situation they compress so much as not to recover elasticity when again exposed to the full power of sun.

The substances which I have thus shown you to be supplied by vegetables illustrate some of the great number of uses to which they may be applied. Many which in themselves are so ornamental that we deem their end fully answered did they only con- their beauty to the prospect, are found to contain properties remarkably conducive to comfort and enjoy- The ingenuity of man discovers and applies them, every one who finds out the means of appropriating either to add to the pleasure or to alleviate the sufferings of his fellow-creatures, ought to be regarded merely with the respect to which superior intellect is but with the gratitude which is due to the bene- of mankind.

Letter IX.

Country Walks—Fuller's Teasel—Evil of Superstition—Water in the Teasel Leaf—Pitcher Plant—Wild Pine—Canes in the Andes—River Side—Effect of Streams on Vegetation — Water Lily—Yellow Water-Lily—Water Arrow-Head — Love of the Country — Water Plantain — Persuaria — Forget-me-not — Meadow-sweet — Purple Loosestrife—Silver Weed—Weeping Willow—Poplar—Legend respecting the Aspen—Alder.

You often walk into the country, and it is well for you that you do; "God made the country, but man made the town," said one who looked upon Nature with the eye of a lover and a poet. What can be more exhilarating than the breezes that blow upon you as you wander upon the hill? When can you gaze upon aught that shall present to your mind so many new and beautiful images, as when your eye rests upon the wild scenes of nature? Whether you look upon the soft green carpet at your feet, or watch the changing and pillowy clouds that pass over the azure sky; whether you lie among the wild flowers beside the rippling stream, or actively pursue your way through the wood amid the entangling branches, —all is beauty and delight. Even though the remembrance of the falling leaf and the fading flower should intrude, yet can you never forget that spring will again revisit the earth to stock it with loveliness, and that what to you shall appear in the season of winter to have perished will flourish again in renewed youth and beauty; an emblem of that more glorious spring which shall one day renew with fresh-born powers and splendour the frail bodies of those whom we mournfully number with the dead.



Fuller's Teasel—*Dipsacus Fullónum.*

There is a plant growing wild in many places on hedge-banks, around meadows, or on waste spots generally, when the soil is pretty good, called the Fuller's Teasel (*Dipsacus Fullónum*), which is very useful in cloth manufactures. Its stem is about three or four feet high, and quite full of sharp prickles. The flowers are situated on a receptacle or head of an oval shape, which you will find some pleasure in examining after the blossoms have fallen off, for the beauty and regularity of its structure. This receptacle is set with awns, at the end of which are hooks. Perhaps this plant may be familiarly known to you by the name of devil's broom, which it is often called by the country people; its chaffy head covered with the long awns rendering it not unlike a broom in appearance. In some villages, whose distance from towns has prevented the cottagers from receiving much instruction, the superstitious people attach a high value to this plant, from its supposed virtue in removing the ague. Upon cutting open lengthwise the head of the teasel, you will find enclosed in it a worm, well known to naturalists as the solitary teasel-worm. The country people collect several of these worms, always taking care to have an odd number of them, as five or seven. They then place them in a quill, and hang them around the patient's neck.

Situations remote from towns are often considered peculiarly favourable to simplicity and virtue, and many beautiful poetical descriptions of secluded villages serve to maintain the illusion; yet I believe it will be found that many of the most retired spots in our land are chiefly remarkable for the ignorance and superstition which are prevalent there. In some villages this practice of curing the ague by the teasel-worm is regarded with so much confidence, that it is impossible to induce the sufferer to resort to medical treatment until he has tried this method of relief and found it ineffectual.

As this custom is not productive of any injury to the patient, you may be disposed to regard it as a matter of no importance. All superstition is, however, unfavourable to the advancement of truth, and an error of any kind seldom exists alone in the mind, but generally forms a link in a lengthened chain. Those who are prone to regard with veneration the spells and charms too often applied by the ignorant, are little likely to exert their minds for the discovery of any kind of truth; superstition always casts a veil over the understanding.

In the northern and western counties of England, teasel is cultivated in fields to be sold to cloth-dressers to the manufactories. The heads are fixed around a large and broad wheel, and to this wheel, while turning, the cloth is applied. The woollen knap is thus raised by the hooks, which are sufficiently pliable to prevent them offering so much resistance as would tear the cloth.

The seeds of the teasel are planted in March, but the heads do not form until the month of August in the following year. It is of great importance to the plantations that the soil be good, as, should this not be the case, the prickles which render the plant so serviceable would not appear, or would be very small. This may often be seen in the wild specimen, as varieties of this teasel are found with very small awns.

When the teasel is fit for use it is cut and laid in the sun in bundles to dry, unless the weather be wet, when it is placed in a dry room. The teasel-fields are very often the property of the cottagers in the neighbourhood of cloth manufactories.

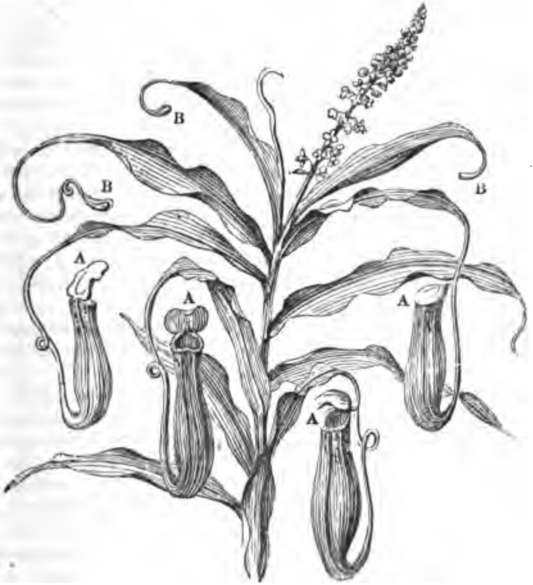
The leaves of this plant, which are large and irregularly notched, were formerly very generally used in medicine, and are still resorted to in the cure of some complaints by village practitioners.

The botanical name of this plant, *Dipsacus*, is taken from a verb signifying to be thirsty, and was apparently given from the opinion that the teasel required for its own refreshment the large supply of water with which its leaves are furnished. This water, however, appears to be designed for the use of birds and insects quite as much as for rendering any service to the plant itself. The leaves grow in pairs on the stem of the teasel, and unite and close around it, making at their bases a small reservoir capable of holding a large glassful of water. The vein down the middle of each leaf serves for a channel. The rain pours down this little channel into the basin below, which by this means becomes filled with the liquid, and will remain in this condition for some time. I have often, on a warm day in summer, seen in the teasel-leaf a clear draught whose appearance was most inviting.

It does not appear that this water is absorbed by the stem or leaves of this plant, as after a while the leaves bend down with its weight, and it runs off by the same course in the leaves by which it entered. It falls on a spot at a considerable distance from the stem; and the only way in which it can at all relieve the drought of the plant is by moistening the earth around the fibres, which may thus imbibe refreshment.

That insects derive a supply from this little basin is very evident, as we may often see floating upon the surface of its water many a little winged creature, which, too eager to enjoy the beverage it offered, have fallen into it and perished. A very singular plant called the Pitcher-plant (*Nepénthes distillatoria*), contains in its vase-like leaf a glassful of water. This liquid is not, like that contained in the teasel-leaf, formed by the accumulated drops of the summer shower, but is secreted through the stalk of the leaf. The pitcher-plant is often found on boggy plains in the East Indies, in Amboyna, Madagascar, and some other places. Each of its leaves ends in a closely-shut tube like a tankard; and the lid of this tube, which prevents the liquid from evaporation, either opens after some time by itself or is lifted up by insects, who derive from the clear water within a more pleasant refreshment than they could procure from the surrounding bogs. Indeed the exhalations of these marshy grounds are often, in the moist and hot climates where they are situated, of a most noxious and fetid quality. The water of the pitcher-plant is sweet and exquisitely clear.

On some occasions it may afford enjoyment to the thirsty traveller, while to the numerous little worms and insects it is a frequent and abundant resource. One species of small shrimp especially lives in its waters,



Pitcher-plant—*Nepénthes distillatoria.*

revelling in its limpid stream, and feeding upon many other insects which are drowned in the fountain at which they came to sip.

The Chinese call this plant pig-basket-grass, from the resemblance of its leaves to the baskets in which they carry their pigs for sale. The Malays superstitiously fancy that the gathering these plants causes rain; and Rumphius mentions that when he wished to obtain some specimens of it from the mountains of Amboyna, the people refused to procure them; alleging that if they emptied these natural fountains the rain would fall upon them before they could reach their dwellings.

In the hot climates of the West India Islands grows the wild pine (*Tillandsia*), which displays an admirable place of refreshment, and is thus described:—"The large barren wild pine of the West Indies is a parasite, and might be denominated an aquatic plant; for although it is suspended in air between lofty trees, to whose boughs it is fastened by numerous roots, yet it is not indebted to those boughs, like the misletoe, for nourishment, but only for support. The leaves, which much resemble the pine-apple, but are larger, surround this plant in a circular manner; each leaf being terminated near the stalk with a hollow bucket which contains half a pint of water. It is by these numerous small reservoirs of water that the roots, as well as every other part of the plant, are supplied with nourishment without the help of any earth.

"One contrivance in the nature of this plant is admirable. The seed is covered with many long downy threads, not only that it may be carried by winds, but that by these threads, when driven through the boughs, it may be held fast, and stick to the arms and prominent parts of trees: so soon as it sprouts or germinates, although it be on the under part of the bough, its leaves and stalks rise perpendicularly and erect; if they assumed any other direction, the cistern just mentioned, made of hollow leaves, could not hold water, which is necessary to the life and nourishment of the plant, and in scarcity of water useful to birds, insects, and man."

As this plant appears to attach itself to the branch of the tree, and not to derive sustenance from the tree, it is most likely that, in the language of modern botanists, it would be termed an epiphyte, a term I have before explained.

Our admiration of the care for the comfort of his creation shown by Him who has thus arranged this plant, is increased when we consider in what situations He has caused it to flourish. Not in the mild climate of the temperate zones, where the rays of the sun are so subdued as but in few instances to cause pain either from heat or its attendant thirst; not in those countries where the gentle rain alternating with the sunshine secures the wanderer from perishing for want of water; but in those lands where the sun shines so intensely that the bright verdure of the grass is withered by its influences; or where the change of seasons presents either a long period of uninterrupted rain, or a similar space of dry weather, where heat is unmitigated by a single shower.

In the countries near the Bay of Campeachy, where the two seasons of rain and drought expose the land either to being overwhelmed with the one or parched with the other, the celebrated navigator Dampier describes these resources when nearly falling victims to thirst, by which in these forests many hunters and travellers annually perish. After mentioning that the leaves of these trees often contain a pint and a half or a quart of water, he says, "When we find these juices we stick our knives into the leaves just above the roots, and the water gushing out, we catch it in our hats, as I have often done to my great relief."

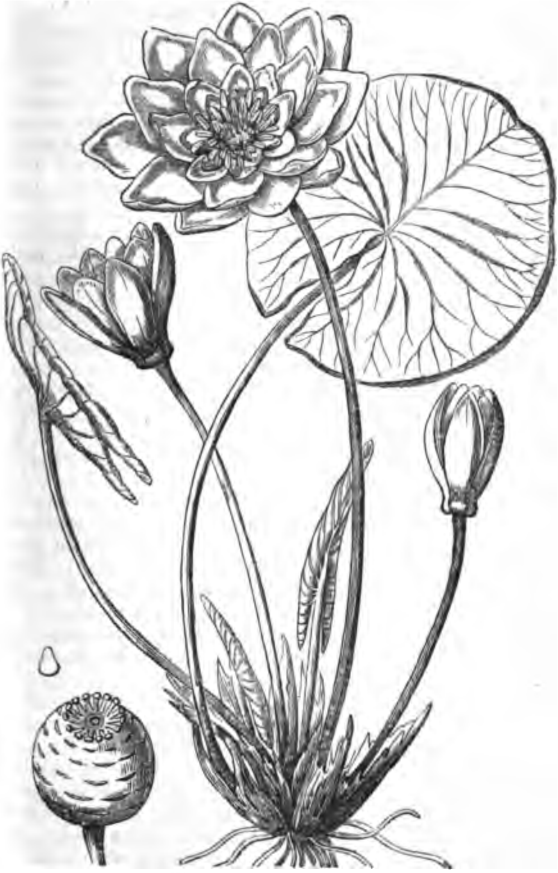
The Andes or Cordilleras, a large chain of high mountains in South America, are passed by roads some of which are so rugged that even the mules, though trained to their ascent and accustomed to its difficulties, can scarcely keep their footing. By the sides of several of these roads are thick and extensive forests, and a benevolent contrivance for allaying the thirst of the wearied traveller of these mountain-passes may be seen in the canes which grow upon their borders. These canes are of a great height, and their stems, which are very large, hollow, and jointed, contain during the whole of their growth, and until they begin to wither, a great quantity of water.

One singular circumstance respecting the quality of this liquid is, that when the moon is full it is clear as crystal and in great abundance: but as the moon wanes, it gradually diminishes and becomes thick, until just before the full moon the water can scarcely be found at all. The water exists in the joints of the cane, not in each joint, but in every other one alternately. The Indians consider this liquid a certain remedy for bruises, and always administer it to those who experience any of those accidents so frequent in these dangerous roads. Whether or not this fluid possesses the healing efficacy ascribed to it by the Indians, it supplies on many occasions when greatly needed a refreshing and delicious draught.

At no time of the year can we in this country realize the full force of that comparison of Scripture, "it 's a river of water in a thirsty land." On a warm summer's day, indeed, the ground may be dried, and we at noonday may feel languid and weary from the smallest exertion. The draught of pure water or the juicy berry may be a welcome refreshment, and when after a sultry day the gentle evening comes on, the stroll in the open air may be delightful. The termination of a day in the tropics, however, witnesses the flowers fading, and the foliage of the trees languidly drooping, until they are revived by the copious dew of night. In such scenes a gentle rivulet or an artificial fountain bears an aspect of refreshment and coolness, which adds greatly to the attractions a river offers to us.

But even in England the margin of the calm lake or the flowing rill is a spot very interesting to the lover of natural beauty. There some of our most beautiful flowers spring up; there the banks are greener than elsewhere; and there the soft breezes play with peculiar freshness. And then, too, how sweet are the sounds of the waters as they gurgle over the stones or flow with a whispering noise among the rushes! and so composing are they, that the agitated bosom is often hushed into calmness, and the tired wanderer sinks to sleep, as a child soothed by the murmurs of its mother's lullaby.

Many very lovely flowers grow in the water, rearing their heads and some of their leaves upon the quiet surface of the stream. There wave the banner-like blossoms of the yellow and purple flags (*Iris Pseud-Acorus* and *Iris fœtidíssima*), in rich and varied beauty. Under the shadow of the drooping willow the fair white water-lily



Water-Lily—*Nymphæa alba.*

(*Nymphæa alba*) blooms in unsullied elegance, bending with the slightest breeze that agitates the water, or softly reclining upon its smooth surface: like some of the enjoyments of earth, it perishes almost as soon as obtained, for it scarcely survives its gathering, and no care in tending it will keep it alive more than a few hours. Botanists designate the flower *Nymphæa*, because, like the Nymphs or Naiads of the classical poets, it loves to haunt the streams, and delights in the shadow of the foliage that hangs over them.

A yellow flower called also the water-lily (*Núphar lutéa*), but which has somewhat less pretensions to that beauty which we associate with the name of lily, abounds in many streams, and with its big stems and heart-shaped leaves has a pretty appearance. The country people call the flower brandy-bottle, because its large yellow blossoms have a strong smell of brandy.

You are probably acquainted with the water arrowhead (*Sagittária sagíttifolia*) of our streams. This plant is very beautiful, its white flowers forming a lovely contrast to the rich green of its leaves. The leaves too possess remarkable elegance of form, and exactly resemble the point of an arrow. This plant is very common upon the borders of rivers, and may be seen on many parts of the Thames about London. It grows sometimes on that part of the river that washes the borders of Temple-gardens, seeming almost like a little verdant islet amid its darkly-coloured waters, and bringing to the mind of the dweller of the city remembrances of country-walks by the side of clear streams, and perchance of the seeming haunts of his childhood.

That love of the country which is implanted in the bosoms of many, from its having been in early life the scene of their enjoyment, is seldom perhaps wholly extinguished by a long residence in the crowded city in after-life. Imagination reverts to the fair landscapes once daily familiar, decking them, it may be, with beauties which another eye might not see. Often the ardent longing to wander again among the hills and valleys which surrounded his early home, prompts the busy man to the active improvement of present advantages in the business of life, that he may realize the means of ending his days in the sweet seclusions where they commenced.

And who would wish to banish from his memory the scenes where his youthful days were passed, associated as they are in the mind with friendship warmer and more disinterested than many of those of later life, and with hours when light of step and light of heart he dreamed not of care or grief, but like the lilies of the field took no thought of the morrow? It were well, if when parting with the thoughtlessness of childhood, we gained that confidence in God which might preserve us from heaviness of heart.

The water-plantain (*Alísma Plantágo*) rears its branches in almost every stream, and has a strange appearance with its numerous small rose-coloured flowers situated on its branched stem, and its broad and pointed leaves; while three different species of the numerous plants called knot-grass or Persicária (*Poly'gonum*) ornament the watery ground on its border. The pink blossoms of these plants are extremely bright and beautiful. One species (the *Poly'gonum Persicária*) has upon its smooth leaves one or more large black spots which are supposed by the peasantry of Scotland to have originated from a drop of Our Saviour's blood having at the crucifixion fallen upon one of these plants, which grew at the foot of the cross. But we might wander far among our wild flowers without finding any to equal in beauty that one which among almost all the nations of Europe is considered sacred to love and friendship. The bright azure blossoms of the forget-me-not (*Myosótis palústris*) fringe the borders of many a clear and meandering rill, or almost cover the little isles which lie upon its surface. This bright flower has a yellow centre, and a small vein of white at the base of each division of its corolla. While the flower is not yet fully blown, the buds are of a delicate rose-colour. The leaves are usually hairy. When blooming in large clusters and great profusion among the bright green of its leaves, or the moist grass, and surrounded by the limpid waters, it has indeed an aspect so lively and attractive that we cannot wonder at the peculiar honour bestowed upon it. The pretty legend which tells of its origin is doubtless familiar to you, and most probably had its birth in the imagination of some poet, who wished to throw around so lovely a flower the charm of a poetical association. Then there is the graceful meadow-sweet (*Spíræa Ulmaria*), or queen of the meadow, as it is often called, which waves in large clusters of delicate white flowers over the stream, casting its snowy petals upon its bosom, and wafts its perfume so far away over hill and dell that its sweet scent reveals its presence long before its beauties meet the eye. Somewhat of this fragrance remains after the flower has withered, and the specimen of the meadow-sweet in the herbarium of the botanist will often impart its perfume to all the flowers in the collection. Years after the specimen itself has perished its sweetness will linger, as the kind tones of a departed voice will rest on the memory long after its fragile owner has mingled with the dust.

The flowers of the meadow-sweet are clustered lightly on a stem three or four feet in height, and its leaves grow in groups of three together, their under-surfaces being white with a downy covering.

The purple loosestrife (*Ly'thrum Salicária*), with its showy spikes of beautiful and bright purple flowers, arrests the eye immediately it gazes upon the margin of a stream, and may vie with many flowers which, from their being the natives of far distant countries transplanted into our gardens, are regarded with great admiration.

The silver-weed (*Potentílla Anserina*) that grows about the river-banks is a very pretty little plant. Its notched leaves have on their lower surfaces a thick clothing of silky down, which gives them the appearance of silver, whence the plant has its familiar name, and I dare say you have often seen this silky part turned up to view among the herbage. The large yellow flowers of the silver-weed are soft as velvet, and creep along the watery margin. St. Pierre says this plant is very common on the borders of the Seine in France, and that it is eagerly sought for and eaten by the ducks and geese. Whether our English poultry have in this respect the same taste I have never been able to ascertain.

Several very graceful willows (*Sálix*) are to be found in the neighbourhoods of lakes and rivers, and the pendent branches of the well-known weeping willow (*Sálix Babylonı́ca*), and its bluish green foliage, render it peculiarly ornamental. Many species of willow furnish the twigs used for baskets. Some of them supply timber. Their bark is useful for tanning, and that of one species (the *Sálix Russelliána*) is used as a substitute for Peruvian bark. The weeping willow, a tree ever regarded as an emblem of sorrow, is not an indigenous tree, but a native of the Levant, and its plantation among us is owing to a circumstance both interesting and remarkable. The celebrated poet Alexander Pope, having received from Turkey a present of a basket of figs, remarked, while unpacking it, that one of the willow-twigs of which it was composed was forming a new shoot. He placed the twig in his garden, which in course of time became a fine tree; and from this tree have sprung all the beautiful weeping willows which are so frequent in moist grounds. We can but regret that a tree planted by the poet, and one which has been so conducive to the picturesque beauty of our scenery, should not have been suffered to perish by the hand of Time rather than to have been felled by the axe of the woodman.

The Lombardy poplar (*Pópulus dilitáta*) lifts its tall spire upon many marshy soils. This tree, though having, when planted in lengthened rows, rather a formal appearance, is often ornamental to the landscape, its lofty summit waving to every breeze. I have seen it growing alternately with the weeping ash, and thought that, when mingled and contrasted with it, it was really beautiful.

The trembling poplar or aspen (*Pópulus trémula*) has its leaves so lightly hung, with their stalks so compressed, that they are shaken by every zephyr. The Highlanders, whose superstitious fancies often lead them to invest with mystery causes which are obviously natural,

LETTER X.

Umbelliferous Plants—General Appearance—Pith of Plants —Influence of Moist Situations—Wild Carrot—Coriander-Plant—Angelica—Poisons—Hemlock—Water Dropwort —Fatal instance of Poison—Water Hemlock—Appearance of Poisonous Plants—Christmas Rose—Wild Hellebore—Foxglove—Monkshood—Nightshade — Nettle — Uses of Nettles.

I HAVE not attempted throughout this work to give you any idea of the various arrangements of plants made by botanists according to their peculiar systems. These are formed upon characters which belong to all the plants in the same class, but their classification could not be rendered intelligible to one wholly unacquainted with the science. I shall, however, devote a few pages to the consideration of some of the large class of umbelliferous plants, because this objection does not apply to them, as they are so much alike in their general appearance and manner of growth, that if any one of them is known, it will lead to a detection of the remainder.

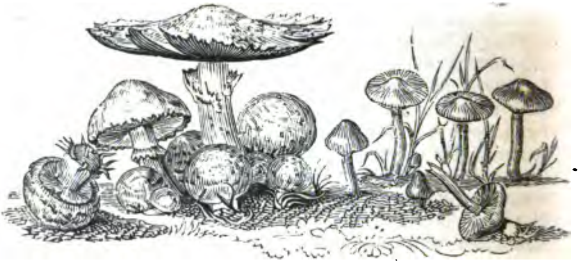
The flowers of umbelliferous plants are among the most minute of our blossoms; but, raised upon one common stem, and clustered together in small bunches, each of which is situated on a short stalk, they make a conspicuous appearance. The small stalks diverge from the middle like the spokes of an umbrella. Sometimes the middle cluster of flowers is lower than the rest, when the head is of a convex form, as in the wild carrot; sometimes the central cluster is the highest, and then it is concave, as in the hemlock. The flowers are, in almost all the plants of this class, of a white clour, but a few of them, as the fennel, are yellow. They are most numerous in the spring of the year, and at that interesting and cheering season their leaves, which are of a lovely green and a very elegant form, add greatly to the beauty of the hedges.

The umbelliferous plants will not grow in very hot climates: not one of them is to be found in the torrid zone; but in some countries of Europe, and in countries both of Asia and Africa, whose climate is warmer than that of England, they are greatly superior both in number and beauty. If in the spring you gather any one of these plants, you will generally find its stem hollow and containing a beautiful silver-looking lining. If at a later season you examine the plant you will perceive in the hollow stem a number of ragged fragments, which appear as if the growth of the outer part of the stem had been too rapid for this delicate lining, and thus torn it: and this is, indeed, exactly the fact. This internal part is the pith of the plant, and the same substance, though differently arranged, which at that season of the year occupies the interior of the young shoots of the elder and currant-bush, where it is of a greenish-white colour and spongy substance. I have often seen boys gathering it to make whistles: and the elegant rice-paper, so often used by ladies for painting or the manufacture of ornaments, is the pith of a Chinese plant called by the natives Toong-shue.

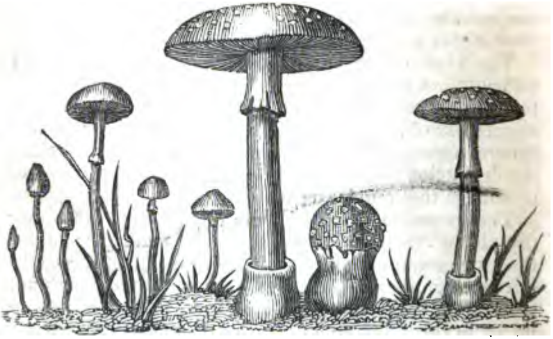
The class of umbelliferous plants presents a great difficulty not merely to the unpractised botanist, but to the more advanced student; and some eminent men of science have directed to it the studies of many years. The general appearance of the various plants being so similar, the distinction between their several species is formed of characters that require a great deal of attention.

The greater number of these plants when inhabiting dry places are of an aromatic nature, and valuable for their stomachic virtues: but when growing on the banks of rivers or other moist places, they ought on no account to be eaten. Some of our most deadly poisons are contained in this class, and they are generally produced by those among them which are found in watery places.

Indeed plants whose character is doubtful are always most likely to be dangerous when found under such circumstances. The common mushroom (*Agáricus campéstris*), when it grows near the water, contains a great quantity of poison; and, although we do not often hear of accidents arising from eating it, it is chiefly owing to the fact that in England mushrooms are but little used for any other purpose than making ketchup, where not only the quantity taken of it is small, but the



Eatable Agárici.



Poisonous Agárici.

method of preparing it weakens the effect. Plants which in a raw state are extremely pernicious are often rendered quite innoxious by boiling, as the principle of vegetables is greatly influenced by heat. On the Continent mushrooms are eaten at table dressed in a greater variety of way; and death is more frequently occasioned by their use.

The wild carrot (*Daúcus caròtus*), a plant frequent in every hedge, is well known to you. This is the origin of our garden carrot, and an examination of its root will serve to convince you of the value of cultivation, as its inferiority to the garden vegetable is very perceptible. Its clusters of flowers are very pretty, as their white is very clear and their form very regular. Their central floret is of a crimson colour, and this little mark serves well to distinguish the wild carrot from many similar plants, this distinction being quite peculiar.

The seeds which, enclosed in sugar, are sold by confectioners under the name of coriander-comfits, are obtained from an umbelliferous plant which grows wild in several parts of England; though it is generally thought to be the product of seeds formerly planted in the neighbourhood where it is found, as it was once much cultivated for medicinal purposes.

The Angélica Archangélica, which is another plant much used in confectionary, a preserve being made of its stalks, is occasionally found wild, though it is not very common. In some parts of Warwickshire it is abundant. It flowers in September, and its stem is about four feet high. It has in its undressed state a pungent flavour, too powerful to be agreeable. It grows very plentifully in Lapland and Sweden, and is thought by the people of those countries to possess excellent medicinal qualities. Few of the Laplanders who have a garden neglect to cultivate the Angelica, and they resort to it as a remedy in numerous complaints.

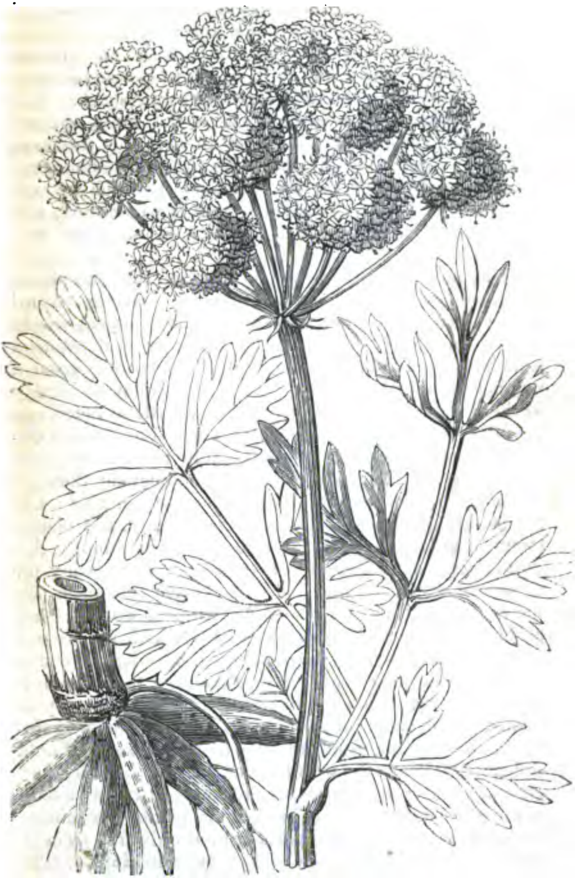
The chief service rendered by the umbelliferous plants to mankind is yielded by those among them of a poisonous kind. The hemlock (*Cónium máculatum*), which is very common in most counties of England, may be distinguished from plants which in many respects resemble it by the purple spots that thickly overspread its stem and branches, and by the powerful and unpleasant odour which it emits when either these parts or the leaves are bruised. The extract procured from this plant is much used in the cure of diseases, and to the physician it is perhaps more valuable than many beautiful and pleasant plants. Among the ancient Greeks the dose of hemlock was administered as a means of death, and it was by this fatal draught that the venerable and enlightened Socrates fell a victim to the superstitions of his countrymen.

The water-dropwort (*Œnánthe crocāta*), the effect of whose effluvia upon the constitution I have before mentioned, is of this class. It is a large and rank-looking plant, its stem about four feet high, and full of a poisonous orange-coloured juice. Numbers have perished by eating this plant, for, as its appearance somewhat resembles celery, it has been mistaken for that vegetable. Both the garden and the wild celery have, however, a great distinction in their peculiar scent, and they are both devoid of the juice. The wild celery, whose stems are much more slender than the dropwort, is, however, a poisonous plant.

Great care ought to be taken by those unacquainted with botany in eating any plant which is not known to them. In many cases the scent, or the dingy appearance of the foliage in flowers, is sufficient to show the dangerous nature of the plant; yet it is unwise to presume on the absence of any visible indications.

The botanist indeed possesses infallible means of distinction, by which, under any circumstance of country or climate, he can detect the presence of poison by an examination of the structure of the vegetable. This knowledge is, as you may easily suppose, of incalculable value to the traveller in strange countries.

There prevailed, at one time, a great mortality among the cattle in some parts of Lapland, for which their owners were quite unable to account. Linnæus discovered that it was caused by the cattle having eaten of the water-hemlock (*Cicúta virosa*), an umbelliferous plant



Water Dropwort—*Œnánthe crocáta.*

which grows either on the banks of rivers or ditches, and which in this instance grew under the water.

Animals are, however, provided with an instinct which enables them in most cases to perceive what kinds of food are wholesome for their own species. If a horse be placed in a pasture where the most noxious plants are growing, he will reject them; as is the case when he meets with the Œnánthe Phellándrium (another plant called the water-hemlock), which he will not touch. To the cow, however, it is wholesome, and she, being guided by her faculties of smelling and tasting, feeds upon it unhurt.

It is, indeed, wisely arranged by God that the plants designed for pasture are not equally inviting to all his creatures: were not this the case one animal would deprive another of food, and the necessity of affording a sufficient supply of the same kind of plant to so great a number of animals would prevent that display of variety in the vegetable kingdom which now affords so much opportunity for research and admiration. The various objects of nature are not placed before us that we may extend our hand to gather them, and, without any thought or pains, to receive from them all their advantages: but to man are given intellectual powers to study, and bodily strength to labour for the extension of their value. All that is necessary to be known respecting our destiny for a future world is revealed with great plainness by the Scriptures; but for our comfort in this world we are required to exert the capacities with which we are endowed in order to make the requisite discoveries. We may remark, in favour of cultivation, that even the soils most friendly to vegetation commonly become by it more productive as the nature of the product is rendered more valuable. In every important attainment each one of us should endeavour to leave the world better than we found it, that, even as regards others, we may not have lived in vain.

It is a singular fact respecting plants containing poison, that some of their parts are not only free from an unwholesome quality, but are very nutritious. The potato, which when boiled is so valuable a vegetable, bears little poisonous green knobs upon its branches. The leaves and flowers of the peach-tree contain a bitter and poisonous juice; while its fruit is wholesome and delicious,and its gum is of a gentle and mucilaginous nature.

Poisonous plants very generally present, either in their blossoms or leaves, a dingy uninviting appearance. The hemlock has its stem spotted with brownish purple, and its foliage of a dull green. The flowers of plants whose nature is deleterious are very often of a dark purple colour; but, as a proof that this distinction is not invariable, I may mention the hellebore, or Christmas rose (*Hellébornus niger*), that blooms in our gardens at the season of the year when they are almost desolate, and is, like one of its winter companions, the snowdrop, of a most lovely white, until it begins to fade, when its petals assume a green colour.

Naturalists have accounted for the prevalence of white flowers during winter and early spring by the circumstance that this colour is peculiarly adapted to reflect the sun's rays. Dark-coloured objects absorb light and heat; and, as at this season of the year the sun's rays are feeble, it is wisely ordained that the flowers should be of the colour best calculated to reflect them in the most advantageous manner. Few who looked upon the Christmas-rose would think that a flower whose appearance was so pure and lovely could contain a quality so pernicious; for if it is taken in large quantities it produces giddiness, and even death; yet the botanist upon a slight inspection would feel assured of its dangerous nature.

There are around the centre of this flower a number of stamens or small threads. When blossoms have these numerous stamens inserted on the receptacle (that middle of the flower where all points meet), we may conclude the plant to be of an unsafe nature. A familiar instance of this is the common buttercup (*Ranúnculus ácris*). The blossoms of the apple-tree, of the plum, the peach, and other fruit-trees, have also a number of stamens, but these are seated on the calyx. If the leaves of the flower-cup and the white petals of the Christmas rose be carefully pulled off, one by one, you will find that the stamens remain behind. If the petals of the apple-blossom be thus used, the stamens will almost all come off with them; and this circumstance determines whether or not flowers thus formed are poisonous.

Two species of hellebore (*Hellĕborus vĭridis* and *Hellĕborus fœtidus*) grow wild in woods. Their flowers, which are of a dull yellowish-green, have a very unpleasant scent; and the latter species has its calyx edged with a dingy purple, its leaves remaining green through the winter. Altogether, its appearance is such that you would probably guess it to be a poisonous plant. As it possesses nothing to invite to the taste, the chief injury that arises from hellebore is owing to its being sometimes injudiciously used as medicine.

The Greek hellebore (*Hellĕborus officinālis*) was thought by the ancients to invigorate the powers of the mind; and when they were about to engage in any undertaking which required a greater portion of mental energy than usual, they were accustomed to take a small dose of it. It is still used by medical practitioners, and it derives its name from two Greek words which signify "to injure" and "food."

The purple foxglove (*Digitālis purpūrea*), perhaps the most beautiful ornament of our summer woods and hedges, is extremely deleterious in its nature; and although when used in small quantities it is a valuable remedy for some diseases, yet in the hands of the unskilful it is replete with danger. Its purple bells are large, and their white and spotted interior very handsome; but its colour is rather of a suspicious character, and, to those accustomed to notice plants, would indicate probable danger.

The monkshood (*Aconītum Napĕllus*), found wild in some parts of England, but so common in gardens that you can scarcely walk in one during summer without meeting it, is a very noxious plant. It is certainly the most gloomy, forbidding-looking flower in the whole parterre. You have perhaps often pulled off the purple hood or helmet of this flower, to see the two long thread-like parts placed underneath, which children call the doves of Venus's chariot. This plant contains so much poison that its scent alone is very injurious, and it ought upon no account to be smelled to, or rubbed over any part of the face. Indeed, were its properties more generally known, we should not have it so often in gardens to which the children of careful parents have access. This flower is called also wolfsbane, because the hunters who chase the wolves upon the Alps dip their arrows in an extract procured from the plant, which ensures the death of the wounded animal.

The flowers of the nightshade have the same lurid purple hue, and both our wild species, one of which bears the beautiful ruby-coloured berry, and the other the larger black fruit, are dangerous. The black-berried nightshade (*A'tropa Belladónna*) is called after Atropos, one of the Fates, on account of its deadly properties, and is very common in fields and road-side hedges. A very remarkable property of this plant has been discovered by recent experiments:—When rubbed on the eyebrow it so affects the pupil, or black spot in the middle of the eye, as to make it expand; a circumstance of which the oculist is very glad to avail himself, when proceeding to operate upon the eye.

The other wild nightshade (*Solánum Dulcamára*) has berries which are extremely beautiful in the hedges at the end of autumn, and whose shrivelled remains hang upon the bushes till spring; often attracting the unwary by the resemblance of their colour to the garden currant. Though not so highly dangerous in their nature as the berries of the other species, children often fall victims to their poison; especially in country places where the little creatures roam about alone during the greater part of the day, among the woods and hedges, gathering blackberries, haws, sloes, and the other wild fruits so palatable to children. I shall dwell no longer upon poisonous plants. What has already been said is sufficient to show the folly of those who, unacquainted with the nature of flowers, often pull them from the hedges and taste them, or even eat some part of their blossoms; a practice doubtless sometimes attended with painful consequences.

With one instance of a plant which is not strictly speaking a poisonous plant, and which you will perhaps be surprised to hear contains any portion of venom, I shall conclude my letter. The common nettles of our hedges (*Urtíca*), of which we have three species, have often reminded you of their presence by the pain they have inflicted. Small bags of poison exist at the base of the stiff hairs which thickly cover the surface of the nettle. The wound made by one of these sharp bristles is not nearly so large as that which is made by the point of a fine needle, yet the pain caused by it is far more severe and lasting. The orifice made by the sting of the nettle would not be sufficiently large to occasion the pain we feel, did not the sting convey into the wound this secreted poison, for which it serves as a duct. The structure of this hair and its base are similar to that of the fang of a serpent; which in the same way darts into the wound made by its tooth the venomous secretion.

I have frequently seen boys beating the hedges with a stick, as if they thought that by exterminating the nettle they would perform a valuable service. Nettles, however, are useful in various ways. From the fibres of the stalk a kind of hemp is manufactured by the North Americans; and in some parts of India muslin and calico are made from them. In Madagascar the cordage and sails of the vessels are made chiefly from the fibres of these plants; and the root of one of our most common nettles is useful in dyeing. In many parts of England and Scotland the tops of the young nettles are boiled and eaten as vegetables; and you have, perhaps, yourself partaken of them dressed in this way, as children in the country often eat them thus. Several kinds of butterfly feed upon nettles. One especially (the ***Papílio Urtíca***) lays its eggs always upon the stem of the nettle, and dies immediately. The caterpillars which are hatched from these eggs often so thickly surround the nettle as to give it the appearance of being covered with black velvet. Sometimes these little insects are so destructive to the nettles as to eat away from them all but their stalks and fibres.

LETTER XI.

Leaves—Variety of Forms—Surfaces—Coverings of Hair—Structure of Leaves—Seed-Vessel of Winter Cherry—Uses of Leaves—Perspiration of Plants—Evergreens—Shadows afforded by Trees of Tropical Climates—Uses of Leaves among the Hindoos—Leaves of Talipot-Palm—Leaves formerly used for writing upon—Use of leaves in protecting the Tree—Fall of the Leaf—Beauties of Autumn—Effect of Light on Leaves—Sensitive Plants—Venus's Fly-Trap—Rapid Growth of Plants—Use of Leaves in Persia—Olive-Leaf brought to Noah—Effect of Trees on the Landscape—Lines on the Oak-Tree.

In directing your attention to the leaves of plants, it is not my design to describe their various shapes. You must have observed that the leaves of different plants are variously formed; thus the leaves of the geranium and nasturtium are round; those of the vine and ivy lobed; and those of the grasses long and slender.

The round or peltate leaf, as it is called, of the nasturtium (*Tropælum május*), may have struck your fancy as resembling a shield; and the name of this plant, which signifies a trophy-plant, was given to it by Linnæus on account of its shield-like leaves and the resemblance of its flower to a helmet stained with blood. The forms of leaves, however, partaking of that regularity for which all the works of God are so much distinguished, are always the same in the plants to which they belong; a circumstance which often aids the botanist in determining their species, and in conveying a description of the plant to others.

You have doubtless remarked that the surfaces of leaves vary in different plants, some being smooth and shining, as the laurel; others, like those of the mullein or nettle, being covered with down or hairs. Hairs are often found covering not only the stem but both surfaces of the leaf; when, however, this is not the case, they are frequently found on its under-surface only; and instances are very few in which they exist on the upper part, while the lower is destitute of them.

Hairs serve to keep plants warm in the same manner that the fur of the dog protects him from the coldness of the atmosphere; and on this acccount we often see that plants, while their buds and leaves are young and tender, are covered with hairs, while as they grow older and stronger they become quite smooth. Hairs also serve to collect moisture from the air. Plants growing on dry rocky situations, where they are greatly exposed to the sun, are generally more hairy than those of sheltered spots; and you may often see the hairs of plants rising erect at early morning and late in the evening, to collect the dews with which they are soon bespangled; and during day, when the sun is shining and the air is dry, lying down close to the surface of the leaf.

The upper surfaces of leaves generally facing the skies present the more glossy appearance, and the veins sink into them; while on the under part these generally stand out from the surface.

The substance of leaves consists chiefly of two parts: the vessels or fibres which extend through all the leaf, and give it a firmness of texture that prevents its being broken by the winds; and the green pulpy substance which fills up the spaces between the fibres. Over these the cuticle or skin is spread. You have, perhaps, sometimes picked up, during your walks either in the woods or in your garden, skeletons of leaves formed entirely of the vessels, from which the green substance has been eaten away by insects, or gradually destroyed by exposure to damp. The seed-vessel of the winter-cherry affords a very pretty specimen of a similar kind—the vessels extending like a delicate gauze covering, with its threads quite unbroken over the bright red cherry within. You will find very little difficulty in making these skeletons of leaves; and, as they are very pretty, and show you the situations of the veins of the leaf, I should recommend you to make some. You must for this purpose select in autumn some leaves whose texture is firm, as those of the holly or ivy, and let them lie some time in water until the pulp is destroyed; then with a knife gently take off the upper and under cuticle.

Leaves are useful to plants in the same way that lungs are to animals, by drawing in air for their support, and giving it out again. They also imbibe moisture and again evaporate it. You may easily ascertain the fact that leaves emit perspiration, by placing a young vine-leaf over a wine-glass; when if it be a hot day, you will very soon find the glass quite damp, and in the course of a short time the moisture will run down in drops. The amount of perspiration yielded by a sun-flower (*Heliánthus annuus*) during day is one pound four ounces. The cornelian cherry (*Córnus máscula*) is said by Sir J. E. Smith to perspire in twenty-four hours a quantity twice the weight of the shrub; and Hales ascertained that the usual amount of perspiration thrown off by plants is seventeen times greater than that of the human body. If on some warm, clear afternoon, when the sun has been shining powerfully all the morning, you examine the leaves of the Lombardy poplar (*Pópulus dilatáta*), you will probably find them covered with small drops of clear liquid, which are generally trickling down them like the remains of a shower of rain. It has been remarked that the leaves of those plants which frequent dry and rocky situations are so formed as not only readily to imbibe moisture, but to evaporate it very slowly, thus retaining the moisture so necessary for the plant.

Evergreens generally emit but little perspiration. Our own evergreens are few in number, but the trees of hot climates never at any period lose their leaves so as to present the naked appearance which winter brings to ours generally, but their foliage falls gradually in small quantities, and is continually replaced by the growth of new leaves. This arrangement is peculiarly adapted to the necessities of the human beings as well as of the plants and animals of tropical climates; as the leaves serve not only to defend the tree from the heat of the sun, but also to shelter the inhabitants of those regions and their cattle from its powerful rays. Many natives of the countries in the torrid zone spend the greater part of their lives out of doors, reclining or performing their light manufactures under the shadow of the plantain, and at night sleeping beneath its foliage.

The common table-cloth of the Hindoos is formed either of the leaves of the plantain or of those of the beautiful Indian lotus, whose white or blue blossoms float like those of our water-lily upon the surface of the streams, adorning almost every lake in Hindostan; and are much admired by the Hindoos, forming a source of frequent allusion in their poetical images. "Frail as the dew-drop on the lotus," is a simile familiar to the mind of every Hindoo who would wish to express the mutable nature of earthly happiness. These leaves are large and shining, and a number of them, being fastened together to the size of the table, serve as its covering for their daily meal. Newly gathered leaves form also their sole dishes, which are used but once by the cleanly Hindoos.

The large leaves of the talipot-palm of Ceylon are shaped like a fan. They are, while growing, of a beautiful dark green; but, being cut into strips, placed in boiling water and then dried, they become of a yellowish-brown colour, resembling old parchment; when several strips are enclosed in a wooden case, they constitute the only books of the natives of Ceylon. They are written upon with a pointed steel instrument, and a dark-coloured substance being rubbed over them, remains on the writing and renders it more legible.

It has been supposed that the first material used for writing upon was the leaves of plants; and Virgil represents the sibyl as writing her oracular promises in detached sentences upon dry leaves, which, when the door of her cavern was opened, were scattered afar by the winds.

D'Israeli mentions that it is affirmed by the Roman historian Varro that the leaves of the palms and the mallows were first used as writing materials; and that he assigns this as the reason that the same word expresses the leaf of a tree and that of a book.

The immense leaves that adorn the trees of hot climates are used to cover huts, to shelter their inhabitants from the sun and rain, and for many purposes which a European would not imagine. The traveller in Ceylon is glad to avail himself of the parasol formed by a leaf of the talipot-tree, which is so light as to be no burden even in a climate whose heat is so oppressive. One of these leaves will shelter fifteen men from a sudden rain, and when not in immediate use may be folded as close as a lady's fan.

Leaves are so important as clothing to shield from heat and cold the plants to which they belong, that we may often see the fruit of a tree perish from the leaves having been destroyed by caterpillars in spring. You have probably seen gooseberry bushes in this condition without having upon their boughs one single gooseberry, all the green fruit having fallen off. If the leaves are stripped off a single branch of a tree, the branch will either perish or it will not increase in size. You may indeed have seen the gardener plucking off some of the leaves of peach-trees, and the reason of his so doing is, that this tree, being a native of a warm climate, requires a great degree of sun to bring its fruit to perfection. In this case, however, the leaves are but partially cleared off, for were they wholly removed the unripe peaches would fall from the tree.

As leaves are no longer required for the protection of plants when their fruit has been perfected, the greater number of plants are deprived of their foliage during the winter months; the leaves of some falling in the course of summer, and others in autumn, though some which are called evergreens retain the verdure through the winter, till spring again appears. Some trees, although they wither in autumn, do not part with their leaves until the succeeding year, as the beech-tree, but contrast their brown and withered dress with the bright snows of winter.

Beautiful as is the green mantle with which spring covers the earth,—the more beautiful because contrasted with the aspect of nakedness which it so lately exhibited, yet in richness of colour and in appearance of profusion it must surely yield to the foliage of autumn. The deep red tints of the leaves and some of the stems; the bright yellow mingled with the green hue in the foliage of others; and even the withered branches of some trees whose leaves assume the sombre brown before the year's decline, present a scene of rich, profuse, and varied beauty, which no other season can offer. The under surfaces of some leaves, covered with a white down, float upon the wind and mix among the blue green of the willow and the numerous red fruits which at that season of the year adorn the trees of the woodlands.

The action of light upon leaves and stems produces their green colour, and when kept for a long period in darkness these become white. This may be seen in the common endive of our gardens, which perhaps you have sometimes bleached by the simple process of putting bricks over it to exclude the light. Celery, as you well know, is regularly subjected to bleaching before being brought to table, and by this treatment the vegetable is rendered wholesome, as for want of light and air the poisonous principle which exists in the wild celery is prevented from being perfected.

If plants are placed in a room they invariably lean in the direction of a window, turning towards it the upper surfaces of their leaves to receive the light. Some leaves, however, as those of the iris, grow upright, and have not either an upper or under surface; their position is not therefore changed by this circumstance.

Darkness, although it will not totally deprive the corolla of plants of their gay colours, greatly dims their brilliance, and in course of time completely alters the whole aspect and nature of the plant. A portion of ivy will sometimes, after wandering in all directions over the walls of a building, send forth its branches in some dark place, as in a deeply-shadowed window, or some gloomy nook, where its appearance will be completely changed. Weak and drooping, pale in its colour, and with its stems of an unusual length, you would scarcely recognise the sickly-looking plant as a branch of the beautiful ivy which is throwing its profuse and blooming foliage about the ruin. The following passage upon the subject I have selected for you from the Magazine of Natural History:—"It frequently happens in America that clouds and rain obscure the atmosphere for several days together, and that during that time buds of entire forests expand themselves into leaves. These leaves assume a pallid hue till the sun appears, when, within the short period of six hours of a clear and bright sunshine, their colour is changed to a beautiful green. A writer in Silliman's Tour mentions a forest on which the sun had not shone for twenty days:—'The leaves during this period had expanded to their full size, but were almost white. One forenoon the sun began to shine in full brightness. The colour of the forest absolutely changed so fast that we could perceive its progress. By the middle of the afternoon the whole of these extensive forests, many miles in length, presented their usual summer's dress.'"

The folding and drooping of leaves during night was called by Linnæus the sleep of plants. This phenomenon occurs more or less in all, but in none is it so manifest as in the pinnated leaves of some plants, as the different species of acacia. The leaves of plants, if exposed to the light of a candle, will unfold during the night; and will, upon its removal, again resume their former situation. Some pinnated leaves display a very remarkable degree of sensibility to the touch. The different kinds of sensitive-plant (*Mimósa*) will, if any one of their leaflets be touched, communicate an influence to all the rest, and they will all instantly turn back and fold themselves together; while the branch on which the leaflets grow will approach the stem of the plant. In this position they will remain for a space of time which varies with the period of the day or the strength of the plant. A slight shower of rain will be ineffectual to produce this shrinking in a sensitive-plant; but if the rain fall in heavy drops it will close immediately. A beautiful shrub of this character, a species of mimosa, is said by Niebuhr "to droop its branches whenever any person approaches it, seeming as if it saluted those who retire under its shade;" and the sensitive-plant which adorns many of the beautiful gardens of India, spreading itself in great abundance, will, if one of its leaves be touched, convey the impression rapidly to the numerous plants near; so that every leaflet of a long row of shrubs will fold itself up; and for many hours the plant will continue to exhibit this effect of its singularly delicate construction. The causes of this and some other kinds of irritability evinced by plants have not yet been discovered by naturalists.

If the centre of the leaf of a flower called Venus's fly-trap (*Dionæa Muscípula*) be touched, it immediately closes the sides of its leaves over the object which irritates it. These leaves, being edged with sharp teeth, like those of a steel trap, enclose within its prison any insect which may have been unfortunate enough to choose its leaf for a resting-place.

Have you ever been interested in remarking the rapid growth evinced by some plants? In this respect different species vary greatly; some scarcely making a perceptible advance during some weeks, others in the course of a few hours extending their stems and leaves considerably. Plants in all cases, however, grow more during the night than in the day. Professor Lindley mentions a plant of the mushroom tribe,—a class of plants at all times remarkable for their quick growth,— which was observed by a botanist to grow during one damp warm night from the size of a single point to that of a large gourd. The same author mentions that a leaf of the Urania speciosa was observed by Mulder to increase four or five inches during a day. The quickest growth that I have ever had occasion to remark was afforded by a garden nasturtium (*Tropælum május*), which was trained in a very sunny situation over a garden window. This spot was most likely favourable to the plant, which, although so common in our gardens, is a native of warm climates. The stem of this nasturtium grew during one warm day between two and three inches in length.

In Persia and Hindostan an amusement is very common at the entertainments of rich natives, which consists in writing upon the leaf of a plant some lines of poetry or other original effusion. Bartholomew d'Herbelot, the eminent French orientalist, mentions an interesting anecdote which refers to this custom. Al Mamon, the son of the famous Caliph Haroun al Raschid, was blessed with the counsels and instruction of the sage Kessai. One day, when the prince Al Mamon was at table enjoying the company of several of his young associates, Kessai came to the door of his saloon with the intention of reading a lecture. The prince, unwilling that his social pleasures should be interrupted, wrote upon the leaf of a myrtle two lines to this effect:—"There is a time for study and a time for diversion; this is an hour that I have destined for the enjoyment of friends, wine, roses, and myrtle." Kessai returned the leaf with this reply written on the back:—"If you had understood the value of knowledge, you would have preferred the excellence that it gives to what you at present enjoy in company; and if you were aware who it is that stands at your door, you would directly arise and come and prostrate yourself on the ground, praising and thanking God for the favour he had bestowed upon you." When Al Mamon read the reply, he hastened to exchange the society of his companions for that of his preceptor.

A leaf was once made to convey, in a different manner from that just mentioned, a message of good. What must have been the feelings of Noah and his family, when, after having so long floated upon the bosom of the waters, the dove brought in her mouth the welcome evidence that again the foliage was covering the trees, and again the earth was about to be decked in new verdure and loveliness! An incident so interesting and important to these lone dwellers upon the waters seems to have been the cause that future generations have agreed to designate the dove as the emblem of peace and goodwill.

I need hardly enlarge upon the beauty with which the foliage of trees invests a landscape. A prospect may possess verdant meadows and lovely streams, yet, if wanting in trees, it is not one which the mind would picture to itself in hours spent far away from it, nor is it one to which we should most readily direct our steps when about to seek some of the picturesque scenes of nature. The large trees of Eastern nations are so useful to their inhabitants, that he is deemed by the Turks an enemy to mankind who would level a noble tree; and they would not fail to wish that the sun might pour his rays upon his unsheltered head until he sank exhausted beneath their overpowering influences.

THE OAK-TREE.

Oh! lay not low the green oak-tree,
Beneath whose boughs my childhood play'd;
For dear to all must ever be
Its foliage fresh,—its cooling shade;
Which yet is full and fair to view,
As when the landscape first I knew.

Full many a change the years have brought,
That since have pass'd 'mid sun and rain;
And brows are clouded o'er with thought,
And eyes, once glad, are dimm'd by pain;
And voices, then so full of mirth,
Have perish'd from this bright green earth.

And yet thou art unchanged, fair tree,
Though stormy winds have o'er thee driven;
And still thy verdant canopy
Is freshen'd by the dews of heaven;
And now in youth and beauty's prime
Thou standest all unmarked by Time.

More years may pass o'er thee and me,
And see me laid beneath the ground,
While thou, a young and beauteous tree,
Shalt spread thy knotted branches round;
And oft the child shall seek the flower
That blooms beneath thine ample bower.

But thou at length must droop and die,
  And yield thy beauty to decay;
And that which now delights the eye
  Must from the landscape pass away;
And man alone of all can be
The heir of long eternity.

Letter XII.

Gigantic Vegetation—Baobab—Great Age—Caverns in Interior—Opening of its Blossoms—Form of its Branches—Concluding Remarks—Verses.

I shall in this letter give you an account of one of the most gigantic productions of the vegetable kingdom which are known to us. Those parts of Africa immediately under and about the torrid zone, are remarkable for several instances of plants of a prodigious size; but none can exceed the immense baobab (*Adansónia digitāta*), which flourishes in those countries bordering the Gambia, and some other parts of Africa. This tree received its name from M. Adanson, a French naturalist, who first described it. This gentleman resided several years in Africa, and greatly contributed by his information to our knowledge of African botany.

The French have called this tree the calabash-tree, and named the fruit which it produces Monkey's-bread; but the natives of the countries near the Senegal denote it by the appellation of boui.

We are struck with surprise and admiration when we read of the beautiful and useful banyan-tree of warm climates; a tree whose frequent description must have made you acquainted with its extraordinary size and nature; yet the baobab exceeds even this tree in size; for, although its branches do not extend to so great a distance, the dimensions of its trunk are far greater than that of any other tree.

Time seems to have little effect upon the baobab. Ages roll over it, and it still preserves its strength of frame and youthful appearance. It is yet young while nations which have arisen since its shoot first rose from the ground are known only by their names and past history: and cities have originated, crumbled to dust, and been forgotten, while it has gradually been advancing to maturity. It possesses the faculty of living for many centuries; and not only do its leaves remain green and beautiful, but the heart of its wood is light and tender. Its immense trunk, which is often 100 feet in circumference, though attaining to the height only of thirty feet, has in its interior a great quantity of pith, and when a mouldiness commences, as it frequently does, in the internal part of the tree, caverns of twenty feet high and as many in diameter are formed in the pith. In these caverns are deposited the bodies of the musicians, and of those bards who are found in most uncivilised countries, and who wander from place to place reciting verses and tales which their rude imaginations have framed. Yet it is not, as you may suppose, from a love and reverence to what they might deem the remains of genius, that they give them a resting-place which a poet might deem so appropriate; it is because they fancy that their superior endowments must have been imparted by an evil spirit; and, though honouring and fearing these bards while living, they imagine that the presence of their dead bodies would defile the land and render it unfruitful, and so contaminate the sea as that the fish would perish.

Many are the purposes to which the baobab is applied by the negroes. They use the leaves for giving a flavour to their broth and for seasoning their meats. The fruit, which is in shape something like a cucumber but much larger, is when ripe full of a pleasant acid substance, which when dried in the sun becomes of a pulpy and spongy nature, and is still nutritious. When the fruit is in this dried state its rind is quite black and highly polished.

The Africans consider the fruit of this tree of great value as a remedy in many complaints, and as a preventive to indisposition in general. The negroes about Cape Verd possess the exclusive privilege of collecting the leaves and fruit of the baobabs which grow in that neighbourhood; and it is to the possession of this right, and their frequent application of its advantages, that the strength and courage for which they are remarkable are attributed by the Africans.

The blossoms of the baobab are extremely beautiful. They are of a bright white colour, and immensely large. They spread open their surfaces as soon as the day has fully dawned upon them, and close again at the approach of night, so that they have, by a French naturalist, been called belles de jour (beauties of the day).

The natives of Africa, though sunk in ignorance and accustomed to the daily sight of this phenomenon of nature, seem not so destitute of observation and natural taste as to behold it without interest; but, assembling in little groups during their season of flowering, they stand around the baobabs to await the rising of the sun; and as soon as the flowers, according to their own language, awake from their sleep, they address them with the words, "Good day, sweet lady!"

Not less remarkable than the tree which rises above, is the root which spreads its branches beneath, affording to the baobabs that firmness and support, without which the shock of one of the tempests, which in the course of ages must fiercely blow over its widely-extended surface, would level it with the dust. The central root is of an immense diameter, and extends below the ground to an unknown distance; though the depth of the root is generally supposed to be greater than the height of the tree. But when we consider the great extent of surface which is presented to the winds by the foliage and branches of this tree, we must perceive that this central root, however firm, would not alone have been enough to keep the tree upright. Very large fibres or branches, extending to the distance of 100 feet, and being often three feet in diameter, spread from the main root, and thus by this arrangement the baobab is enabled to resist the elements. In the valley of the Two Gagnacks, a place at some distance from the Gambia, M. Golberry, a French traveller, met with the largest tree of this kind that he saw throughout Africa. Its circumference was 104 feet, but the height of its trunk was not above thirty feet. Its branches extended in every direction, and were profusely covered with most beautiful foliage. The appearance of this astonishing tree was that of an arch, the surface of the baobabs being generally of a concave form. One part of the trunk of this patriarch of vegetation had been severed by the hand of decay, and presented an opening to one of those caverns before mentioned, of twenty feet high, which are formed by the pith.

"The entrance of this cavern," says our author, "was about seventeen feet high, and the negroes of the valley had given it a very regular form. The upper part was composed of two curved lines which formed an angle somewhat resembling the Gothic arches. On the two sides of this entrance were carvings of flowers and animals. The representations were indeed of an uncouth nature, but their very imperfection gave a kind of impressive effect which was felt on contemplating this antique monument, which was entirely the work of nature, except those savage ornaments which seemed to indicate an antiquity far more remote than the discovery of Africa by the Europeans. The negroes had also filled up the interior of the cavern, and, though they had left the rough and rugged forms which characterise such a place, they had nevertheless polished the surface, and in many places had carved the figures of men and animals."

The soil of the cavern was an orange-coloured sand which had been conveyed thither from the banks of the stream. This grotto was recorded by the legends of the people to have once formed an idol temple, but, after the introduction of the Mahomedan religion into the country, the priests had demolished the image. At the time when the country was visited by M. Golberry the cavern was used as a hall of assembly, and was the place of public resort for the chief people of the valley.

"They assembled here," says this gentleman, "morning and evening, and passed whole hours together sitting in a circle on the earth, smoking their pipes and enjoying the supreme pleasure of negroes, namely, that of doing nothing and chatting." "I was not aware that this cavern was the general rendezvous for the principal people of Dock Gagnack, and on my arrival at this delicious valley near the village, the beauty of the baobab above described induced me to pitch my little camp at the side of it. After having admired it for some time I resolved to take up my lodging in the inside and have my bed placed there. I therefore ordered my domestics to perform this task; but, when they began to obey my orders, I perceived a kind of discontent and murmuring between the negroes of both villages, who formed a crowd round my little caravan. I inquired the reason of this conduct, and the chiefs informed me that the cavern was their place of general meeting, but nevertheless offered to place my bed there. I declined their offer, and remained in my tent, which was pitched about ten paces distant from this fine baobab; but the cavern of this tree, one of the oldest in the world, served me as an eating-room, and the disappointment of sleeping there was well compensated by the testimonies of friendship, benevolence, and regard which I received from the inhabitants of this valley during the two days that I resided there."

The branches of these trees, which are covered with leaves in tufts, are of a very flexible nature; hanging towards the earth, to which their extremities approach so nearly, that at a short distance from the tree its stem is entirely hidden from view by their thick foliage, under which the Africans recline during day in total listlessness, or in telling to each other some tale of wonder. At a great distance this umbrageous tree presents the appearance of a large and high cottage of an hemispherical form, covered with a massy and beautiful foliage. Some travellers have said that its distant aspect resembles that of a thick forest.

The vast extent of shadow cast by this magnificent tree must be peculiarly refreshing in that hot climate, where alone it flourishes; and, as we imagine the soft and solemn light diffused upon the ground beneath, we are reminded of part of a beautiful description given by Southey of the banyan-tree :—

> "Beneath 't was smooth and fair to sight,
> Nor weeds nor briars deformed the natural floor,
> And through the leafy cope which bower'd o'er
> Came gleams of checquer'd light;
> So like a temple did it seem, that there
> The pious heart's first impulse would be prayer."

In concluding my letters, I cannot refrain from again reminding you of the importance of studying nature for yourself; of devoting to it some of those hours of recreation which are allotted even to the busiest life, and which with you may be many. Relief from study or business is often afforded by the mere change of employment, by a new direction of the thoughts, and, after a day of fatigue, the investigation of nature will often rather give repose to the mind than add to its weariness.

Let us reject the indolence that would whisper that such knowledge will be useless, for we little know how greatly we may need it. But while I would especially recommend you to observe nature for yourself,—to seek your lessons in the open air,—I can see no reason why you should not call to your aid the results obtained by the investigations of others. If such men as Linnæus, Sir James Edward Smith, and many others, have spent their lives in the pursuit of the knowledge of nature, and bequeathed to us their attainments, surely these are worth our attention. In science, as well as in every business of life, a division of labour is of great advantage; and these great men have added to their own researches the conclusions of the chemist and the geologist. You may object either to botany or to any other branch of natural science, that it is rendered extremely difficult by the number of terms employed. I do not say these studies are without difficulties, but they are certainly not so great as you may suppose. You may commence your engagements as a practical botanist with a very slight acquaintance with these terms, and gradually learn them by practice. Associated as they soon become in the mind with the flowers with which they are connected, they are very easily remembered. It is long before the musical pupil can enjoy the delights of his own music; still longer is it before the student of a language can derive much gratification from his pursuit. But the examination of the flower may commence almost with the study of botany, and you may walk into the meadow or the garden to confirm the truth of the first lesson you have taken.

It is often a subject of complaint that the Latin language should be so generally employed in the descriptions of natural objects. Were it not that there is one language common to learned men, and that all the nations of Europe have agreed to use this language, their descriptions would often be unintelligible—as one person would call a flower by a name different from that used by another. A translation of a foreign scientific work into our language would be attended with great disadvantages; and we should thus be deprived of those continual improvements which are suggested by men of science on the Continent. The various species of the same plant vary in some important particulars; and any information obtained respecting them would be of little use, unless we were able to detect the exact species to which it related. The important experiments of the celebrated Bonnet have been sometimes of far less value than they would have been, had he not omitted to give the Latin name of the plant, or the species, on which they were performed. In consequence of this, no certainty could be felt in some instances that the plant which in familiar language he called by one name might not in the familiar language of another bear a name totally different.

Never, I trust, will you learn to look upon the beautiful objects of nature without connecting them in your mind with the goodness of their Author. His eternal power and Godhead, says the inspired writer, are revealed by the things which are made, and it is alike our duty and privilege to contemplate them in this view. But while we value the lessons taught by natural religion,—while we rejoice in the manifestation afforded by nature of the power and goodness of God,—we must remember that the book of nature, although it confirms that of Revelation, does not supersede its necessity. One attribute—and that too one of deep importance to fallen man—is not declared by nature. The attribute of mercy is peculiar to the Scriptures. Kind and wise we should know from the works of God that he must be, but that he should pardon the disobedient nothing could assure us but his own word. Study therefore, I entreat you, the book of nature; but, above all, lay up deeply in your heart the truths of Revelation.

THE END.

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